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The New Year

Considering the upheavals that have occurred during the year that has passed, nineteen-fourteen has been a fairly good year for the pulp and paper industry. Naturally, as an accompaniment of the depression which has been felt during the past two or three years, business was by no means assuming "boom" proportions, but failures among Canadian pulp and paper firms are not at all apparent, and many businesses have been in a sense maintained by the unfortunate circumstances in Europe.

No one fully realizes, however, the battles which must be fought in industrial and commercial life in 1915. This war must be paid for. Our wealth-producing powers nowadays are simply marvellous, but they will be put to a sore test. Canadians may look forward to an unprecedented economic situation in the coming year. Already the strain of the war and the financial difficulties are striking close to the heart of our nation. The problem of the diversity of paper prices and gold prices may yet be felt.

Nineteen-fifteen opens before us, a year unparalleled in the world's history. Its chief marvel will be its opportunities — not necessarily only opportunities for trade expansion, for that may involve merely readjustment—but opportunities for the stout hearts in the industrial world to prove their worth.

The Pulp and Paper Magazine can not do more than wish its readers good cheer and the use of their highest powers in dealing with the problems which lie before them in the New Year.

Technical Education

In the Report of the Royal Commission on Industrial Training and Technical Education, appears the result of the Commission's investigations into the correspondence schools in the United States in the university of Wisconsin. University extension is carried on in part by correspondence study in which students who come from ranks of laborers, apprentices, farmers, business men, club women, teachers, lawyers, clergymen, doctors, etc., are enrolled. Some members of the University Extension Division of the University are appointed for correspondence study alone and devote their entire time to it. Others divide their time between correspondence and residence instruction. Others again give most of their time to residence and the rest to correspondence instruction.

The professors and instructors for any course in correspondence read the recitation papers and give the instruction in these courses. Those who carry on the work in industrial education subjects have by their previous training and experience, special qualifications, not only for teaching these subjects, but even for the production of suitable texts.

According to the report of Dr. Seath, in addition to the instruction given through correspondence, professors and instructors from the University make visits to communities in which a group of students are working along the same line and there supplement the correspondence instruction with class-room lectures and individual instruction. "In committees where local centres have been developed, the University has provided a staff consisting of a local representative or manager, usually of professorial rank, and instructors in such branches as have a sufficient number of students to warrant special local instructors, and field organizers to present the character of the University extension work to those who may profit by this form of instruction. These local classes meet in the local university headquarters, in rooms belonging to school boards or public libraries, or in specially appointed class-rooms in a commercial or industrial establishment set apart and equipped by that establishment for University Extension teaching purposes. In one instance the owner of large business interests has supplied well furnished class-rooms and has equipped them with books for the students' use. He has also offered to pay the fees of all employees who complete courses of study.''

It is significant of the success of the scheme that of the total number who began work only about four per cent dropped out before completing the course, and those who did so had good and satisfactory reasons. One of the well-known defects of the commercial correspondence schools has been that so many students drop out. This defect President Van Hise realized shortly after the establishment of his University Correspondence School. In this connection he says:

''The extension movement at the University has developed beyond our most sanguine expectations; indeed has expanded day by day, and I see before it almost limitless opportunity. Correspondence work at the outset followed the model of the commercial correspondence school, but Director L. E. Reber soon saw that there were two defects in that system—the defect that each student was obliged to work by himself, and the defect that he did not come in contact with his teacher. These two handicaps are so great that only a small percentage of those who begin a course of instruction continue to the end. It requires a great deal of stamina for a man, after he has worked nine or ten hours in a shop, to sit down by himself in the evening, study a lesson and write a paper; and thus a very large percentage of students in correspondence-study courses have in the past fallen out before the end is reached. To remedy these defects it was suggested that the artisans should be gathered into classes, and meet a teacher. Hence, we have instituted the travelling professor.''

''But in order to make this more successful, it was necessary to get the co-operation of the merchants and manufacturers. Therefore we came into Milwaukee and presented the case to the merchants and manufacturers of this city. Some of them said, we will give you an opportunity to meet the men in our shops; a number of them offered quarters for class-rooms; and some of them went so far as to say, we will pay the men for the time they are receiving class-room instruction. In Milwaukee at the present time we have more than 1,000 students doing vocational work in twenty different manufactories. Thus, the defects of correspondence work have been remedied, and instead of some ninety-five per cent dropping out of a course before its completion, less than five per cent do so. Already we are told by the merchants and manufacturers of Milwaukee that the effect of this movement is seen in the increased efficiency of their workmen; that it furnishes them better-trained foremen, and in greater numbers.''

It is interesting to note in connection with the report on the advantages offered by correspondence study, the Royal Commission has recommended that—

(1) Correspondence-Study Courses be provided in connection with Provincial or Inter-Provincial Institutions for Industrial Training and Technical Education to serve workers in Industrial, Agricultural and Housekeeping occupations who are out of reach of classes.

(2) That Travelling Instructors be arranged for to conduct Industrial Classes at intervals in small places where the population or attendance is not sufficient to engage the whole time of a teacher.

(3) The employment of Supervising Instructors to visit small places where Industrial Classes are conducted and to assist any teacher of little experience to make the best of the time of the pupils.

(4) That when Correspondence-Study Courses are provided by a Central Institution, Travelling Instructors should be provided to meet, from time to time, those who follow the Correspondence-Study Courses to explain such difficulties as might not be easily removed by correspondence only and to encourage them to complete a Course.

The presence of travelling instructors seems to make a great deal of difference with the applications of students to the course, as it is found that in the case of ordinary commercial correspondence courses, such as are well known on this continent, only about from 5 to 10 per cent of the students who enroll, finally finish the course. Whereas in the case of the University of Wisconsin and the University of Chicago, over 70 per cent of the students who enroll finish the course.

The success of the correspondence course of the Inland Printer Technical School, conducted under the auspices of the International Typographical Union, is well known throughout America. This course was evolved much in the same way as that represented by Mr. Crossley in the last issue of the Pulp and Paper Magazine. That is, that from the columns of the technical journal, should be evolved a series of questions and answers which should ultimately take the form of correspondence and a regular course of study between instructor and student. The report proceeds:

From the standpoint of the International Typographical Union it is necessary that this instruction be imparted at as low a price as possible—free from the taint of profit—for the sole object of the plan is the advancement of the student. The Inland Printer School management declared its willingness to co-operate with the Union in any method that gave promise of widespread dissemination and be satisfied with the prestige that accrued from being connected with such an uplift movement. At the time it was estimated $20 would about cover the cost of outfit, postage, tuition, etc., and that figure was agreeed upon as the price at which the scholarships should be sold. The International Typographical Union on its part agreed to defray all expenses incidental to advertising the course, and in addition give a rebate, or prize, of $5 to every student who pursues the lessons to their end with ordinary diligence and intelligence.

This arrangement made possible the selling of an educational course at the sum named, which as a commercial venture would cost $50 or $60, perhaps more. The unusual method of reward was adopted in preference to that of giving large prizes to exceptionally adept students, because the Union desired to stimulate thought on technical matters connected with the craft, certain that in doing so it would widen the workfield for compositors.

So anxious is it to give him the best possible information, that the Commission asks each student to keep a pad beside him and jot down anything which seems to interfere with his work, initialing it and sending it to headquarters, where it receives the earnest attention of the instruction department. A detail of the method employed is interesting. The student sends in his lesson, be it one on lettering, design or a piece of type composition. The instructor takes it up, goes over it carefully, letter for letter or line for line, as the case may require, marking such defects as are apparent and showing where and how to improve, all the while talking into a phonograph recorder, giving his reasons for the alterations and criticisms and advising the student. The phonograph record is transcribed on a typewriter and the typewritten letter of advice and criticism, together with the marked lesson sheet, are mailed to the student. By this means the latter gets the benefit of a blackboard illustration and oral instruction at the same time.

The great value of the I.T.U. Course lies not in the printed lessons, but in the criticism and advice which flow in a steady stream from the instruction department, couched in language familiar to the printer-student. It may be that other correspondence courses do not concern themselves so much about details of this kind, but the Commission maintains that in these details lies the chief value of the course. The students learn by doing, and doing correctly, under the eye of capable and painstaking tutors. Being shown why his work is wrong and how to correct it is of inestimable value to a student.

The International Correspondence School of Scranton, Pa., of which a description appears in the Royal Commissioners' Report, has had phenomenal success throughout America. Over 32 courses involving such subjects as civil engineering, mechanical engineering, plumbing, structural engineering, textiles, etc., are taught.

The text-books, examinations papers, etc., used by the school have all been compiled by experts and constantly revised until all difficulties likely to be met with by a student have been eliminated. On being returned by the student each paper is examined by two Examiners (the one checking the work of the other), and then submitted, in many cases, to a specialist before the corrected papers are sent back to the student. Each lesson is based on the previous one sent in by the student. It is not a stock letter, but is specially dictated for each particular student. The courses are checked by practical men so as to ensure their being up-to-date in every particular. As for instance, when the Electrical Drawing Courses were revised, the men that went over them were the heads of the General Electric Company and of the Westinghouse Company.

It is admitted that students on taking up the course are brimful of enthusiasm, but after a few lessons the majority drop the work. However, many of them subsequently resume their duties, even after an interval of 10 or 12 years, and often complete the course eventually. The School has never yet held up a student who desired to complete the course, although the contract calls for its completion within five years .

These points, gleaned from the official report above referred to, show that in some respects technical education by correspondence is a great success. It all has a bearing upon the question which has been laid before the pulp and paper industry in the article of Mr. T. Linsey Crossley, in the last issue of the Pulp and Paper Magazine. The attention of our readers is invited to the correspondence which follows.

Correspondence

Editor Pulp and Paper Magazine

Dear Sir,—

I read the article upon "Technical Education in Papermaking," by Mr. T. Linsey Crossley, in the December fifteenth number, with great interest. I wish to heartily endorse the ideas there put forth.

I have long been interested in the problem of further education for the men at work. I am quite sure that many will grasp eagerly at any educational opportunity offered to them.

We find in every mill a few who have extensive detailed knowledge of its technical processes and many with limited knowledge of any but that which forms the basis of their daily work. These two classes can be brought together with mutual profit. It is not alone an obligation upon the part of the more favored and better educated man that he should be glad to form a class to study the technique of his industry with other workers. He also will profit from such an arrangement quite as much as the others. It is quite apart from the question of "noblesse oblige," although this should also be recognized.

A periodical such as yours can do a great deal in promoting technical education. Many of the regular articles, such as those by Steffanson published early in the year, are of very considerable value and could be made to serve even a much wider use by a little planning to make them serve with others written specially to assist those who are trying to obtain further knowledge of the paper trades.

I enclose a couple of pages upon which are outlined my ideas of educational possibilities for workmen who desire to obtain either a more complete general or technical education. I have had some experience along the lines suggested and believe thoroughly in the possibilities of classes at the mill.

Very truly,

ENGINEERING MANAGER,

East Walpole, Mass. Bird & Son.

Education for Efficiency; Efficiency in Education. These two phrases fit properly into the latest development of management and industry. For some years past, owing to the intensive specialization of modern life the industries have been inclined to question from whence shall come the trained workmen of the future. The workmen have wondered how they were to find opportunity to fit themselves for advancement.

Some means of technical or vocational training must be provided. Fortunately, this is not a difficult thing to do. A wealth of material for the purpose is already at hand.

The public educational plant should be used to the maximum extent possible and be made available for the use of any or all of the people. We have regular day schools for all grades. There should be regular night schools of all grades to serve those who cannot afford the time to obtain the education they desire in the day schools and to serve immigrants and others who have not had the advantage of a good educational system.

There should be a Manual Training, Industrial, Trade or Vocational School, open days and evenings, and serving all the various uses of such schools. Both day and evening schools should use one set of buildings and equipment. The instructing staff should be specially capable for the work assigned and might be the same as or distinct from that of the day schools, so long as the instructors were capable and were not overworked.

Courses should be offered on business lines, stenography, all trades, and the professions, as demand warranted. All instruction should be practically free.

The detail with which such a system would be worked out must depend upon the size and population of the community. The city school systems, in many instances, are offering evening instruction in elementary subjects and in manual training and the trades. This sort of thing is on the increase nearly everywhere.

The colleges ought also to offer through extension work all the educational opportunities that their equipment and staff make possible. The extension work in teaching which a college of technology, for example, may do will consist of—

1 Lectures of an informational or inspiring character, tending either to instruct or arouse an interest leading to further efforts being made by the auditors to improve their conditions.
2 Systematic course instruction under the immediate personal direction of an instructor from the college.
3 Systematic course instruction under the immediate personal guidance of a chosen leader, directed and supervised by a college instructor.
4 Similar instruction directed and supervised by a college instructor through correspondence.

This means of acquiring an education are—

(a) Through one's personal efforts without direct assistance from another, as in reading, observation, experiment and conversation with others.
(b) From lectures which either do not require outside study or reading, or which do direct one's efforts outside the lecture room.
(c) From directed study from a carefully chosen text either through correspondence or through immediate personal supervision.

It is a well recognized fact that there is no royal highway to knowledge, but that what one learns is in proportion to his own efforts. It is also evident that the inspiriational value of association in study with an enthusiastic, magnetic personality cannot be overestimated. So it seems that the best kind of instruction may be obtained through the study of carefully chosen texts under the immediate personal direction of a competent leader or teacher.

The most interested and earnest students of any subject are those immediately engaged in making a living and winning their own advancement by that subject.

In any mill or factory there may be found men who will avail themselves eagerly of any opportunity to learn more about their vocation. These would gladly form a class for study and discussion. As a rule there may be found also some one or more men who have the special knowledge to enable them to organize and lead such a class. With the aid of special lectures and advice from visiting specialists, whose interest might readily be obtained, the class work could be continued each winter season with much profit.

The trade magazines could very well serve as a central bureau of information and assistance. A department of the magazine could be devoted to educational work. Edited reprints could be issued for use as texts. Publicity could be given to all sources of information in this connection and further service could be rendered in interesting trade experts to act as special lecturers where called for.

Classes have already been organized, somewhat on this principle, in certain plants. Under the guidance of the Industrial Service Department of the International Y.M.C.A. thousands have studied arithmetic, mechanics, first aid, and the English language with the assistance of college men from outside. It has been proven that it is equally possible to find all the material within a single plant to supply both students and teacher and that much profit results from the effort.

Why not extend and correlate the class-work in various localities through the medium of trade and manufacturers associations and trade magazines?

Editor Pulp and Paper Magazine.

Dear Sir,—

No doubt the interesting article "Technical Education in Papermaking" by Mr. T. Linsley Crossley has caused considerable thought and comment in the industry and it certainly merits consideration. It is an attempt to solve an intricate and puzzling problem.

That there is a lack of technically trained men in the industry cannot be denied and that technical training in this line is highly to be desired cannot be questioned. To one who has had any connections with the manufacturing of pulp and paper it is very evident that improvements in processes and methods must be made in order to compete with conditions as they are to-day. And it is to the technically trained man that we must look for such developments.

It is greatly to be desired that an efficient school for papermaking be established in Canada, and that young men who so desire be given the proper training to make their services of value to the industry.. In order to place such a training at the disposal of our young men it is necessary to have ample facilities in the way of buildings, apparatus and equipment, and an efficient staff of instructors. This entails a very large expense and it would seem at present almost impossible to finance so large an undertaking. No doubt, in the near future, with the aid of the paper industry, such a school will be established, for all progressive paper manufacturers realize the benefits to be derived therefrom.

There are two classes of men to be dealt with in considering technical education in paper making—men who can spend four or five years at a university getting the necessary training in engineering, chemistry, etc., to fit them for technical positions in the mill, and men, who by reason of circumstances, are unable to leave their work to obtain an education, but must receive their training "on the job." The paper making school will solve the problem for the former, but will be of very little assistance to the latter. On the other hand, lacking a paper making school, any system which will help in the training of the latter class can be taken advantage of by the former. So that as conditions are to-day the problem resolves itself into some form of training for the man who is unable to spend a number of years at a university acquiring the necessary technical education.

Mr. Crossley in his article has suggested two plans: one, a correspondence course and the other in the nature of a university extension course with a travelling instructor. In the case of paper making it would appear that both methods can be used to advantage, but at the present time it would doubtless be best if the travelling instructor could be introduced.

The writer has seen both methods used side by side in the case of mechanical engineering, and the results undoubtedly showed up the extension course (with instructor) to great advantage. In those instances in which the influence of the instructor was brought to bear the students were more enthusiastic and evidenced higher powers of observation and analysis and more clearly scientific method in both studies and shop practice.

In my judgment it would hardly be possible to get a correspondence course pure and simple into successful teaching operation. A good beginning might be made, but the personal influence of an instructor is practically a necessity.

It would be interesting to secure the views of the majority of the paper makers on this matter of technical education, and to summarize their views in the columns of the Pulp and Paper Magazine. This is a course which I should heartily recommend.

STUDENT

W. J. Finlay of the Strathcona Paper Co., Strathcona, Ont., was in Montreal last week on business and closed several contracts for building paper for the coming year.

Boston News

(Special to Pulp and Paper Magazine.)

Boston, Mass., December 25, 1914.—A representative paper maker of Holyoke was in town recently. He said that J. F. Martin, representing H. D. Pochin and Company, Ltd., of Manchester, England, a china clay and chemical house, had come over on the Transylvania after an adventurous journey. Mr. Martin had visited some of the paper mills at Holyoke and was enroute to New York State, the Miami Valley and Canada.

It was reported that Mr. Martin had given a very lucid account of the state of British trade since the beginning of the European War. It was his report that the news mills of England had been very busy at the outset of the trouble and that they were able to reduce a large part of accumulated stock at the rare price of three cents a pound. It was not long, however, before the publishers cut down the size of their papers to about one-half of normal, and left the manufacturers in just about the same position as they were before the war began, namely, running about full time and accumulating stock. There was a woodpulp scare, which led to the payment of fancy prices, with but a poor demand for paper.

Another point brought out by Mr. Martin was the coal situation. There has been some fear that England would place an embargo on coal and thus cripple the wood-pulp industry of Scandinavia. With Austria and Germany out of the buying market and home consumption diminished by the poor state of manufacturing, there is plenty of coal for some time to come to meet all the demands both foreign and domestic, at fairly reasonable prices. An embargo does not seem to be a very reasonable possibility.

LAURENTIDE AFFAIRS.

At a meeting of directors of the Laurentide Company held in Montreal recently, Sir Thomas Skinner, Bart., was elected a director. The board is now composed as follows:—Sir William Van Horne, president; Geo. Chahoon, Jr., vice-president; R. B. Angus; J. K. L. Ross; C. R. Hosmer; Edwin Hanson; F. A. Sabbaton and Sir Thomas Skinner.

Sir Thomas Skinner is also a director of the Canadian Pacific Railway Co., and the Canada North-West Land Co., and a governor of the Hudson's Bay Co. He is a prominent figure in London financial circles and his election adds strength to the Laurentide board.

The addition of Sir Thomas Skinner to the Laurentide directorate is generally taken to signify that the company has made arrangements in England for securing the funds required to retire existing obligations and provide funds to complete the development work under way when the war broke out. A bond issue for this purpose was authorized some time ago, but never issued. That Sir Thomas represents influential British interests is taken for granted

Changes in Management.

A change at the Laurentide plant was recently effected, involving a well-merited promotion. Mr. J. O. Mason was given charge of the production department, news, ground wood and sulphite

THE RELATION BETWEEN STOCK AND MOISTURE IN WET NEWSPRINT STOCK

By EDWARD J. TRIMBEY, M. E.

(Written Specially for Pulp and Paper Magazine.)

In a previous article on the "Drying of Paper," the rate at which the water was removed from the wet paper as it passed over the dryers from the last press to the calenders was shown, but no reference was made to the ratio between the weight of water and the weight of bone-dry stock in the liquid, or semi-liquid stock in its passage from the beaters or the mixing tanks to the last press.

The consistencies and values given in the following paragraphs have reference to newsprint stock and machines, and are given on the bone-dry basis.

The stock in the beaters is a slowly flowing mass at a consistency of from five to six per cent generally, it is diluted somewhat before going to the Jordan Engines and is later considerably diluted after it leaves the stuff-box of the paper machine to bring it to a condition in which the fibres will be free to weave together to form the sheet. This large amount of water which is added to the stock must be removed, and removed quickly. Until one stops to give the matter thought, it is difficult to realize that when the stock passes under the "slice" it contains roughly from 125 pounds to 200 pounds of water per pound of stock, and that by the time it passes between the couch rolls, about four to six seconds later, it contains only from six to seven pounds of water per pound of stock and that by far the greater part of this drainage takes place in the first second, or half-second, after leaving the "slice." But even this does not tell the whole story, this reduction from 125 or 200 pounds to six or seven pounds is pounds of water "per pound of stock" and not per "pound of paper," and, as will be shown later, there is a considerable difference between the pounds of dry stock passing under the "slice" and the pounds of paper passing between the couch rolls.

Leaving the couch rolls it is a sheet of wet paper and one of the chief concerns of both the designer and the man who finances the coal pile is to make this "wet paper" as dry as possible in the few seconds that still elapse before it goes to the dryers; water can be pressed from the sheet comparatively cheaply, but it costs money to remove it by means of steam heat, since each extra "per cent of paper" in excess of 30 per cent on leaving the last press means a reduction of about 200 pounds of water per ton of paper, in the amount the dryers will be called upon to remove, and each pound of water removed from the sheet by the dryers requires from one and one-third to one and three-fourths pounds of steam, depending upon the way in which the condensed (or not condensed) steam is handled.

In dumping the beaters, or the mixing tanks where no beaters are used, the stock is generally sluiced down with white water so that the stock going to the Jordan Engine and thus to the machine chest will be much thinner than that in the beaters. Three and one-half per cent may be taken as a fair average value of the consistency of the stock coming to the Regulating Box at the paper machine, or about twenty-seven and one-half pounds of water per pound of stock. Leaving the Regulating Box the necessary amount of stock unites with sufficient white water from the trays and the suction boxes to dilute it to the desired consistency at which it is to go onto the wire.

The consistency at which the stock for newsprint goes to the wire varies greatly in different mills and on different machines, depending upon the "freeness" of the stock, the speed, length of wire forming surface, and the amount of suction carried; the weight of the sheet has some influence also, but the range of weight for newsprint is not very great. As the speed is ordinarily chosen to fit the length of wire, the factor which has the most direct influence in determining the consistency at which the stock comes to the wire is the "freeness," influenced somewhat by the amount of suction and the percentage of filler carried.

Tests made by the writer on a large number of machines in different mills have varied from as high as 0.86 per cent to as low as 0.51 per cent. It is impossible to be more exact without giving a list of the individual tests, as it has been found that on two machines of the same size and speed running side by side that the consistencies would be, say 0.63 per cent and 0.75 per cent. Whatever the exact consistency may be in any definite case, the amount of water which must be removed from the stock is very large. Watching the water draining through the wire into the save-all trays it is easily seen that a large part of the draining takes place in the first few feet after leaving the "slice," but just what the rate of drainage is at the various points from the "slice" to the first suction-box is an interesting question, and while it has been investigated at at least three mills to the writer's knowledge, no record of these tests has appeared in the trade journals.

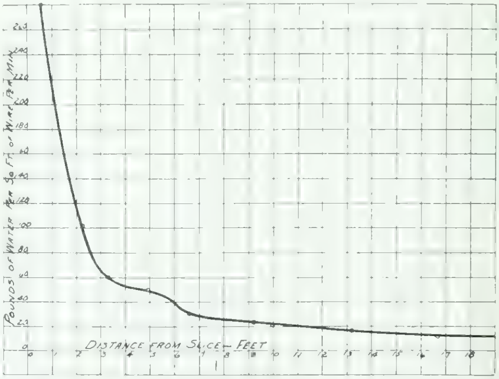

Fig. 1—Showing rate of drainage on an inclined wire.

Fig. 1 shows this rate of drainage on a machine operated at a speed of 465 feet per minute, with a 9 in. pitch to the wire. This is the average of two tests made at different times. Referring to the curve, it is seen that immediately after passing the "slice" the rate of drainage is about 300 pounds of water per square foot of wire per minute, but the rate decreases very rapidly to about 60 pounds of water per square foot of wire per minute and then, after a change in the rate which is interesting to note, it decreases gradually until just before reaching the first suction-box water is leaving the wire at the rate of about 12 pounds per square foot of wire per minute. The average rate of drainage from the "slice" to the suction boxes was 50 pounds per square foot of wire per minute. Tests at two other mills on machines at higher speeds and with much "freer" stock gave values of 63 pounds of water per square foot of wire per minute, and 60 pounds, respectively.

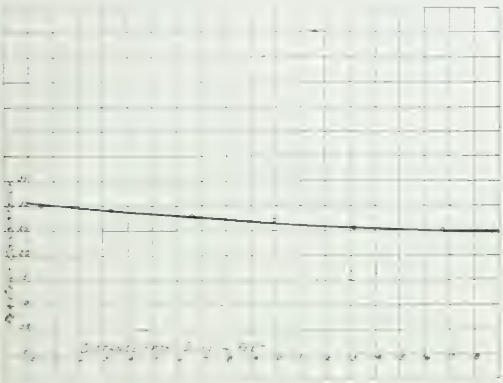

Fig. 2.—Showing the consistency of the white water drained through the wire.

At first glance the abrupt change in the shape of the curve at about four feet from the "slice" might be attributed to an error in the measurements, if it had not occurred in both tests and at the same part of the curve. The reason for this change in curvature is as follows. When stock passes beneath the "slice" it is in a very dilute condition and the water and some particles of stock pass through the wire at a rapid rate; as the stock becomes more concentrated, owing to this extraction of water, the tendency is for the rate of drainage to decrease with such a rate of negative acceleration as would produce a smooth curve when plotted as in Fig. 1, but at the same time when the stock passes beneath the "slice" it is travelling at a lower rate of speed than is the wire; with the wire moving rapidly beneath the stock the tendency is for much less water to drain through the wire per square foot per minute than would be the case were the stock and the wire relatively at rest. The tendency toward rapid drainage due to the dilute condition of the stock is, however, so much greater than this opposing tendency to retard the rate of drainage due to the difference between the speed of the wire and the speed of the stock that the effect of the latter is lost sight of at first. As the stock passes along its velocity increases due to the inclination of the wire and to the friction between it and the wire, and as its velocity approaches nearer to that of the wire there is a tendency for the rate of drainage to increase; at the same time, owing to the increasing concentration of the stock there is an opposing tendency for the rate of drainage to decrease and there comes a time when the negative acceleration of the one cause is equal to the positive acceleration of the other and for a short space of time the rate of drainage remains constant, but as the negative acceleration is greater than the positive (which becomes zero when the stock reaches the same speed as the wire), the rate of drainage again falls off at a gradually decreasing rate.

The consistency of the white water drained through the wire at various distances from the "slice" is shown by Fig. 2. From Fig. 1 we can compute the pounds of white water drained through one square foot of wire at one-foot intervals, measuring from the "slice," by dividing by 465 which was the speed in feet per minute and having computed the weight of liquid stock per square foot at the "slice" we can obtain the pounds of liquid stock per square foot on the wire at any position. Taking the pounds of white water draining through the wire per square foot at the various distances from the "slice," and from Fig. 2 taking the consistency of this white water, the amount of dry stock coming through the wire in each one-foot interval can be computed and by subtraction the "weight of dry stock per square foot of wire" from the "slice" to the first suction-box is obtained, giving the values plotted in Fig. 3. Having the weight of liquid stock per square foot on the wire in each one-foot interval and, from Fig. 3, the weight of dry stock per square foot we can compute the consistency of the stock at any point, and in this way obtain the values for plotting Fig. 4.

An inspection of Fig. 4 shows that the stock came onto the wire at a consistency of 0.675 per cent, and went to the first suction-box at about two and three-fourths per cent. Referring again to Fig. 2 we find that the average consistency of the white water drained through the wire, or the tray water as it is generally called, is about 0.295 per cent or 43 per cent as rich as the stock coming onto the wire from the headbox. I believe that this fact will come as a surprise to most readers, unless they have made tests as to the relative consistency of the tray water and the supply to the wire; for while most mill men realize that there is considerable stock working around and around in the cycle from trays—to mixing box—to wire—to trays, it is not generally known that the amount is so large. From Fig. 3 showing the "pounds of dry stock per square foot of wire," we note that while 0.0104 pounds remains on the wire just before reaching the

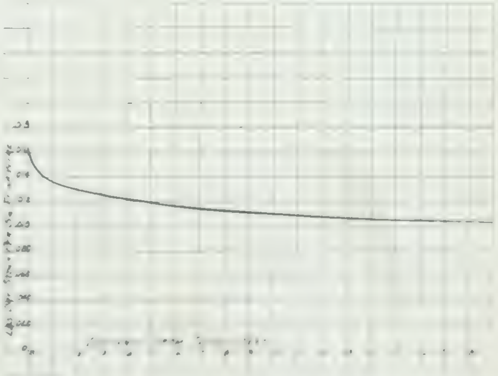

Fig. 3.—Showing weight of dry stock per square foot of wire.

suction-boxes, that 0.0163 pounds comes beneath the "slice," or, about 60 per cent more than reaches the first suction-box. In a previous paragraph attention was called to the fact, that the amount of water removed from the stock in forming the sheet was much greater than at first appeared when considering only the consistency at which the stock comes from beneath the "slice," and the consistency at which it leaves the couch rolls.

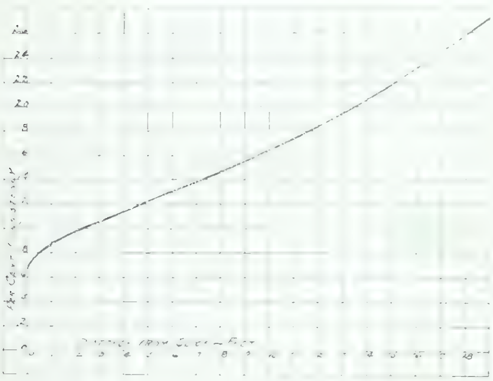

Fig. 4.—Showing the consistency of the stock at various points on the wire.

Noting that the white water from the trays was more than 40 per cent as rich as the stock coming to the wire from the head-box it might be thought that this was an exceptional case; that it is fairly representative of machines running on newsprint will be seen by reference to Table 1 which gives average values from a number of mills, showing approximate speed, the consistency of the supply to the wire in per cent, and the consistency of the tray water expressed both as per cent of stock, and as its relative consistency compared with that of the supply to the wire.

Table No. 1.

No. of Tests	Average speed Feet per minute	Per cent consistency Supply to Wire	Tray Water	Ratio between Tray Water an Supply to Wire
2	285	0.695	0.243	35%
2	380	0.80	0.345	43%
2	360	0.69	0.29	42%
2	390	0.70	0.273	39%
2	410	0.74	0.367	49.5%
4	455	0.65	0.295	45.5%
6	475	0.58	0.21	36%
6	475	0.67	0.278	41.5%
5	500	0.56	0.238	42.5%
5	500	0.69	0.245	35.5%
5	520	0.63	0.23	36.5%
4	600	0.615	0.235	38%

In nine of the twelve series of tests listed in Table 1 the number of tests given signifies the number of different machines tested, with sometimes as many as three different tests from each machine; the other three series of tests were made on one machine, but at different times.

It will be noted that among these averages the lowest average consistency of the stock going to the wire from the head-box was 0.56 per cent, and the highest was 0.74 per cent; the lowest individual test, however, was 0.51 per cent and the highest 0.86 per cent, or from 195 pounds of water per pound of dry stock to 115 pounds of water per pound of dry stock.

There is no definite relation between the speed and the ratio of the consistencies of the supply to the wire and the tray water, for at the slowest speed, of less than 300 feet per minute, we have a ratio of 35 per cent, and at the fastest speed a ratio of 38 per cent. As these tests all refer to newsprint machines there is no wide variation in the weight of the sheet to influence this ratio, though there was a marked difference in the character of the ground wood used, the per cent of filler furnished, and the efficiency with which the general white water problems at these mills were handled, covering as they do a period of several years and at different mills.

While there is a wide variation on different machines in the consistency of the stock up to the time it reaches the suction-boxes, the variation after leaving the suction-boxes and until it reaches the dryers is not so great. The sheet must be reduced to a certain degree of dryness before passing between the couch rolls or it will "crush" and there is an upper limit to the amount of water which can be taken out by the suction-boxes.

It is difficult to remove samples between the last suction-box and the couch rolls and there is the danger of injuring the wire in attempting to do so; one such test made by the writer on a machine at 420 feet per minute gave 12.5 per cent at this point. The consistency of the supply to the wire was 0.64 per cent, tray water 0.225 per cent, sheet leaving couch rolls 14.8 per cent, leaving first press 23.1 per cent, and leaving second press 28.6 per cent.

Table 2.

Consistency of Wet Paper.

Leaving Couch	Leaving 1st Press	Leaving 2nd Press	Leaving 3rd Press
14.8	23.1	28.6	
13.9	23.3	26.0	
13.4	20.1	27.6	29.4
....	27.3	31.8	
....	25.2	30.0	
....	25.4	29.0	
....	25.4	30.9	
13.2	23.5	29.0	
13.0	25.5	30.5	
13.5	23.2	30.2	
12.6	21.5	28.0	33.0
13.8	25.2	31.4	
13.5	24.5	30.8	

The above table gives the results of tests on thirteen machines ranging in speed from about 375 feet per minute to 500 feet. Eleven of these machines were equipped with only two presses and gave averages as follows:—From couch 13.5 per cent, from first press 24.7 per cent, from second press 29.8 per cent. The two machines which were equipped with three presses showed about 21 per cent from the first press, and 28 per cent from the second press. It will generally be found that on three-press machines the first two presses are not made to remove as much water as is removed on machines where the sheet goes to the dryers upon leaving the second press.

A long series of tests made on two 154 in. machines, one running at 540 feet per minute and the other at 580 feet per minute gave averages of 30.8 per cent and 29.9 per cent upon leaving the third press.

I have recently seen the results of tests made on a high speed news machine to determine the effect of the speed upon the degree of dryness which could be obtained at the couch, first press, second press and third press. The machine was running at 600 feet per minute and tests were made at the four points mentioned, the speed was then reduced to 500 feet per minute and similar tests made. The results showed that at the higher speed the sheet contained about one-seventh more moisture at each point than it did at the lower speed. It does not seem that the difference should be as great as this. As the speed increases the more difficult it is to remove a given percentage of moisture, but so much depends upon the weighting of the presses, condition of the rolls, etc., as well as upon the speed.

Some machines are running without a top couch roll, and it is reported that the sheet is as dry as when the top couch roll was used. Another mill reports making tests to determine the water removed by the couch rolls by testing the sheet for moisture when the top roll was used, and then raising the top roll and repeating the tests, and could find no difference between the two, indicating that no water was removed from the sheet by means of the couch rolls.

Generally, there appears to be considerable water running back on the bottom couch roll, and while some of this may come from the water used at the guard-board it seems reasonable to believe that a large part of it is pressed from the sheet by the action of the couch rolls. If no water is removed by the couch rolls there would be an advantage in running machines without the top roll. Further tests to determine this point definitely would be interesting and valuable.

It is desirable to have the sheet as dry as possible before it goes to the dryers to have the remaining water removed by the action of steam, and the builders of paper mill machinery are trying various ways of increasing the amount of water removed before reaching the dryers. One firm building paper machines advocate the use of a suction roll ahead of the first press, claiming that it will result in cleaner felts which will consequently wear longer, and that it will, in effect change the first press into a second press and be equivalent to equipping a machine with four presses

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FOREST PRODUCTS LABORATORIES OF CANADA

By JOHN S. BATES, Ph. D.

In the list of Canada's natural resources the forest stands second, with an annual production amounting to over $170,000,000. In recent years we have come to realize, however, that the timber resources of Canada are **not** unlimited and that, as a matter of fact, it will require careful methods of conservation to meet the permanent demand for wood, even within the borders of our own country.

The Forest Products Laboratories of Canada were established in 1913 under the jurisdiction of the Forestry Branch of the Department of the Interior. The Canadian Forestry Association, the Canadian Pulp and Paper Association and a number of far-seeing Canadian citizens are to be credited with bringing this matter to the attention of the Government. At the same time it is safe to say that the Forest Products Laboratories would not have been possible but for the personal interest and judgment shown by the Honourable W. J. Roche, Minister of the Interior and Mr. R. H. Campbell, Director of Forestry. It was decided to accept the generous offer of co-operation extended by McGill University and the laboratories have therefore been located in Montreal, with headquarters on the university campus. The mutual advantage of such a location will at once be recognized.

The Forestry Branch, which has been in existence since 1899 is occupied primarily with the conservation of the forests themselves and is concerned with such problems as preventing fires, reforesting and regulating methods of lumbering in the national forest reserves, and in general educating public opinion in the proper care of living trees.

The Forest Products Laboratories on the other hand are interested in the conservation of forest resources by proper utilization of the raw material. The purposes of the laboratories have already been outlined in Forestry Branch Circular No. 8. As the name of the Department suggests the great proportion of time will be spent in the experimental investigation of wood and the many products which can be manufactured therefrom. Investigations are being undertaken with a view to extending the knowledge of wood itself, pointing out improved methods for using the raw material furnished by the Canadian forests and finding ways and means of utilizing the vast amount of waste wood which is occasioned in the lumber and allied industries. The success which has followed the efforts of the United States in their Forest Products Laboratory at Madison, and of Germany and other European countries in their various scientific laboratories has shown the possibilities of parallel work in Canada.

Through the untiring efforts of the first superintendent, Mr. A. G. McIntyre, the first units of the laboratories were organized in the latter part of 1913. On the resignation of Mr. McIntyre the speaker assumed the duties of superintendent in April last, and Mr. W. B. Campbell was appointed Assistant Superintendent. Since that time the various divisions have been more fully equipped and a good staff has been engaged in actual experimental work. The present staff numbers twenty-three, of whom seventeen are technically trained men. Through the courtesy of McGill University two buildings at 700 University Street have been placed at the disposal of the Forest Products Laboratories for a period of four years and these are now being altered to meet present requirements. The of

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Address delivered before the Society of Chemical Industry, Montreal, December 18th, 1914.

fice and laboratory building contains about twenty rooms now in use as general offices, drafting room, chemical laboratory, photomicrographic room, library, exhibits, etc. An adjoining building is now being reconstructed to serve as experimental paper-mill. The use of the university testing laboratory has been granted for the work in timber testing. A small sawmill has been located on the outskirts of the city for handling the wood specimens to be tested. A woodworking shop and machine shop are also available.

An outline of the work in the various Divisions will give an idea of the scope of the work at present being undertaken.

For the Division of Timber Tests a Hatt-Turner Impact Testing Machine and a 30,000 pound Olsen Universal Machine have been purchased. These are installed in the McGill University testing laboratory. Additional equipment owned by the university, including 200.000-pound Wicksteed machine, 150,000-pound Emery machine and 60.000-pound Riehle machine are also used by the laboratories for special work. The first project in this division is a comprehensive series of tests to establish the "Mechanical and Physical Properties of Canadian Woods, as Determined by Tests on Small Clear Specimens." Testing has been in progress for several months on representative specimens of Douglas Fir from British Columbia and Alberta. Other specimens will be tested in due course, so that the absolute and comparative strengths of Canadian woods will be established for the benefit of the wood-using industries. A second investigation now under way is the testing of commercial pit props and booms, used in large quantities by the mining industries of Canada, and now in great demand for export to Great Britain. Some three hundred sticks have already been presented by the Dominion Coal Company, Limited. This represents one phase of the general investigation of mine timbers being carried on by the Forestry Branch in co-operation with McGill University. A third project in view is the testing of Douglas Fir and other species in the structural sizes ordinarily used.

The present equipment in the Division of Timber Physics includes microscopes, microtome, photomicrographic apparatus, balances, electric ovens and other apparatus necessary for the determination of moisture content, specific gravity, fibre characteristics and other physical properties of wood. The present scope of this division is limited largely to a study of the physical nature of specimens handled in the Division of Timber Tests. It is hoped to extend the work to include wood seasoning and the many important branches of wood technology

Special stress is being laid on facilities for study in the field of pulp and paper. To this end a separate building is being equipped to allow the carrying on of pulp and paper-making processes on a semi-commercial scale. The equipment, which will be installed in the near future, includes a very complete Fourdrinier paper-machine, which you may be interested to know is the largest experimental paper-machine ever constructed, single and double beaters with interchangeable basalt lava and steel rolls, small Jordan engine, stuff chests, screens, paper-testing instruments, etc. These will be followed by sulphite and sulphate digesters, bleaching apparatus and such other equipment as is necessary to conduct experiments in a thoroughly practical manner.

It is very encouraging to find that the pulp and paper industry is taking a keen interest in this development. I take pleasure in acknowledging the following presentations:—Erfurt Sizing System, presented by Process Engineers, Limited; Fourdrinier wire by the Capital Wire Cloth and Manufacturing Company, Limited; Fourdrinier wire by C. H. Johnson and Sons, Limited; Press felts by Bates and Innes, Limited; Press felts by Arthur P. Tippet and Company. One of the first investigations will be a study of the beating of paper pulp, which will include a comparison of steel and stone rolls.

A Division of Wood Preservation has recently been organized. Although it will be impossible to do extended laboratory work while we are limited to present quarters, arrangements are being made to carry on field tests which should prove of great value. Studies will be made of methods of treating railway ties, telephone poles, mine timbers, wood paving blocks, etc., and records will be kept of the life of treated and untreated timbers under varying conditions. A fungus pit is being installed in the laboratories to allow accelerated tests. The larger Canadian railroads have already expressed their keen interest in our present investigation of ties and we are assured of their co-operation.

The Division of Chemistry is one which bids fair to solve many pressing problems. The laboratories have already been called upon to report on the recovery of potash from wood ashes. In addition to the chemical work, which is closely interwoven with the mechanical and physical tests, it is important to develop research along strictly chemical lines. To overcome the present deficiency in facilities and staff an attempt is being made to encourage and assist chemical research of forest products in various Canadian universities. Queen's University has recently undertaken a chemical study of waste sulphite liquor.

A number of other Divisions will be started when conditions permit. For the present a general study is being made of wood distillation, hydrolysis of wood and allied subjects. In connection with proposed Canadian developments in wood distillation the speaker was present at a series of commercial distillation tests on British Columbia Western Yellow Pine in North Carolina last August. Mere mention of such problems as utilization of sawdust, bark, treetops and stumps is sufficient to show the importance and difficulty of the work before us.

Books, bulletins, journals, pamphlets and other literature on the subject of wood and its products are being collected as the nucleus of a comprehensive library for the benefit of the workers in the laboratories and of the public at large.

Arrangements are being made to collect a complete series of wood specimens from all parts of Canada to be placed on exhibition in the laboratories. In addition to these woods representative samples of manufactured wood articles, pulp and paper, wood flour, composition board, artificial silk, paper yarn and the many other products which can be made from wood will be collected for exhibition and reference purposes. In this way a valuable exhibit of forest products will be available to stimulate the public in conserving and developing our great natural resources.

Two publications have already appeared as contributions from the Forest Products Laboratories, the first being Forestry Branch Circular No. 8, entitled "Forest Products Laboratories" and the second, Forestry Branch Circular No. 9, "Chemical Methods for Utilizing Wood Wastes." A third bulletin on the subject of "Treated Wood Block Paving" will soon be ready for distribution. An announcement of the work in timber testing is also being prepared for publication.

In addition to experimental work, the laboratories are serving to the best of their ability as a public bureau of information on the subject of forest products.

To insure the success of the laboratories in helping to solve the problems of greatest and most immediate importance which are confronting the wood-using industries, special steps have been taken to keep in touch with the industries and with the work of other government bureaus, universities and scientific societies. To this end members of the staff visit various industrial plants, scientific institutions and so forth from time to time and attend the meeting of organizations interested in furthering the use and conservation of wood.

The laboratories are especially fortunate in having an Advisory Committee composed of gentlemen keenly intrested in the welfare of our Canadian forests and possessing a wide, practical knowledge. The personnel of the board is as follows:

Dr. Frank D. Adams, Dean of the Faculty of Applied Science, McGill University.

Dr. R. F. Ruttan, Director, Department of Chemistry.

H. M. Mackay, Professor of Civil Engineering.

F. Howard Wilson, Esq., President, J. C. Wilson, Limited.

Carl Riordon, Esq., Managing Director, Riordon Pulp and Paper Company, Limited.

Judson A. DeCew, Esq., President, Process Engineers, Limited.

R. O. Sweezey, Esq., General Manager, Montreal Engineering Company, Limited.

This outline is presented not so much to show what is now being accomplished as to indicate the possibilities which the future holds forth. The Forest Products Laboratories have begun in a small way. To meet the large needs of this growing country the work of the laboratories must expand. The proving of their worth in public service will surely lead to a permanent home in a new and fully equipped building. It is to scientific societies such as yours and to the universities and industries throughout the country that we must appeal for co-operation in making our work of real value.

One of the most forceful lessons of the present war is the startling realization that Canada is woefully dependent on other countries, in spite of unparalleled natural resources. No less an authority than the Honourable W. T. White, Minister of Finance, said this week, "It is the duty of all Canadian citizens to co-operate in producing as much as possible of what can be used or sold. For Canada at this juncture the watchword of the hour should be production, production and again production."

But can lasting results be obtained without the aid of scientific methods? And would it not be wise to change our motto "Made in Canada" to "Made Well in Canada"? It is the aim of the Forest Products Laboratories to lend practical assistance in attaining this end.

"ONLY A SCRAP OF PAPER"

By J. GROVE SMITH.

Canadian Fire Underwriters' Association.

Of all the arts and crafts that have descended to us from the hoary antiquity of civilizations, dead and gone, that of paper-making is perhaps the oldest. It had its beginning in that ancient paper called papyrus, often represented as scrolls upon the monuments that were fashioned in an era when Pharaoh dynasties held sway in the land of the Nile. Egypt was the birthplace of paper-making, and papyrus marked an epoch in the advance of civilization from the period of folklore and clay tablets as a means of expression.

The plant from which papyrus was made was known to the Egyptians as "papu" and to the Greeks as "deltos." It was a sedge-like plant indigenous to the swamps of the lower delta of the Nile, the river Jordan and the marshlands of Sicily. In physical formation, its stem was the thickness of a man's arm, standing eight or ten feet high, and terminated in an umbel of spikelets surrounded by an involucre of eight drooping sword-shaped leaves.

That being a brief description of the raw material, it is interesting to note the methods used in its conversion into paper. Inside the stem a cellular tissue ran from about root level to the crown, composed of pithy pellicles. In making papyrus these pellicles were laid each one separtely over-lapping another until layers to the thickness desired had been built up. The fabric was then pressed beneath heavy stones for a period and finally dried in the sun.

The papyrus made in early time was of several different qualities. That manufactured from the innermost layer of pellicles was called Hieratica—the paper of the priests. Its sale was interdicted until it was covered with sacred writing, when it became a lawful article of commerce.

In later years some of this papyrus had the writing removed and was sold in Rome under the name of Augustus paper, so-called after the Emperor of that time. A second quality was known as Livia paper, and yet a third as "Fanniana," being the special remanufacture of one Palaemon, a schoolmaster, who had a distinct gift in the way of paper craftsmanship.

The various grades of Egyptian papyrus were used for specific purposes, the best quality being inscribed with priestly rituals and solar litanies, the second quality with civil and historical allusions, while the poorest quality was used chiefly for correspondence,

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Lecture delivered before the Toronto Insurance Institute, December 18th, 1914.

this being often bi-lingual, having both the hieroglyphic and its Greek versions.

Pliny, the historian, who chronicled these facts, asserts that the wonderful properties of the water of the river Nile gave to Egypt the especial qualities necessar for the successful utilization of the papyrus plant, and that without Nile water no cohesion would take place between the membranes of paper pellicles. The idea we now know to be erroneous, for it was undoubtedly the natural gum that exuded from the pellicles under pressure that gave to the papyrus sheet its flexibility, so that it might be rolled into scrolls and also accounts for its wonderful freedom from decay.

Speaking for the moment of the qualities of preservation of ancient as compared with modern paper, it is interesting to note that papyri are in existence as old as the 6th dynasty, or 3,000 B.C. These are of a religious nature, and undoubtedly owe their preservation to the dry atmosphere of the mummy cases in which they were found.

Vast libraries appear to have existed in early times, for we are told that at least 70.000 scrolls of Egyptian writings were in the regal palace of the Ptolemies. While none of these manuscripts have been preserved, we know that such existed in both Greece and Rome, for in the year 1753 a library of 1,800 rolls was examined from the buried city of Herculaneum. While burned, they were with some difficulty deciphered in Naples and found to contain portions of the philosophy of Epictetus. Thus has the record of history, philosophy, culture, and all the elements necessary to advancing civilization found in paper not only an ally, but a prime necessity.

In the later years of the Egyptian papyrus industry, Alexandria appears to have been the centre of manufacture, and the city grew wealthy with this one article of commerce. Although sold at approximately $1 a sheet, it was imported extensively into Greece. Rome eventually took up the manufacture, utilizing material found along the banks of the Tiber, and under Hadrian a change was made from the Egyptian roll into cut sheets that were formed into books by lacing.

About the beginning of the Christian era, paper in a modern sense was made from pulped fibres by the Chinese. The operations of paper-making wasps had suggested the idea that a mashed pulp might be spread into flat sheets and converted into writing material. A variety of substances were used, chiefly bamboo pith, wild cotton, and rice stalks, but the crude processes of fabrication have disappeared from our records and are lost in the mists of time. The secret, if secret it was, became known to the Arabs at a later period, for in the 8th century A.D., Samarcand was a centre of paper manufacture, and many Arabic manuscripts are in existence at the present day.

In Europe, the art of paper making began with the Moors in Spain at the time when Sicily was occupied by the Arabs. With the downfall of Moorish dominance in Europe, the industry declined and finally became extinct.

It must have revived at some time during the 10th century, for we find all the Papal bulls of that period issued on native paper. Italy became famous for its paper manufacture in the 11th century, and the craft was introduced into France about 1189, rapidly spreading thereafter throughout central Europe. In the 12th century Germany led in the industry, with Holland a close second.

The oldest existing documents on cotton paper are the deed of King Robert of Sicily, executed in 1102, and the charter of Frederick II. dated 1228, the later being preserved at Vienna.

Linen as a paper-making substance was first used in Germany, and archives of the Hospital Kaufbeum, bearing the date 1318 witness to the fact.

The saving of rags does not appear to have been practised in those times, and as long ago as 1471 a curious petition was issued by the Pope, asking for the collection of cast-off garments so that he might be enabled to compile 12,000 volumes of sacred writings for the Vatican library. Immediately following, there were various decrees issued and enforced throughout Europe compelling all burial shrouds to be made of woollens in place of linen, in order that more material might be available for paper manufacture. From this early beginning, the practice of saving rags spread, and the rag-picker with his ricketty hand-cart became an established institution. To this day he is a busy agent, and, truth to tell, no mean factor in gathering the material out of which the very highest grade of paper is manufactured.

During all the centuries that have been reviewed paper-making was entirely a hand-process, and England, slow as always in the adoption of new ideas, had been content to import what she required of the product. Not until the year 1500 was the first mill built in England, and that remained the only one for over 50 years. Some crude machinery was then invented for mashing rags and the idea was improved and applied to straws and grasses by Reamur, about the year 1719. Another Frenchman, a few years later, bethought himself of tree bark as a possible raw material, and for his perspicacity he was rewarded with a silver medal.

In 1860, Lloyds, a London firm of manufacturers, introduced esparto grass for paper making, and this became largely used in Great Britain, and so remains to this day for certain grades of paper. Although England was slow in promoting the industry, by the early part of the nineteenth century paper-craft had been brought to a high state of perfection, and the ascendancy has been maintained despite competition. For a fine high-grade product, with strength, and quality of texture, "you've got to beat the English after all."

The first paper mill in America was built by a German named William Rittenhouse, on the banks of the Wissahicon river, near Philadelphia, in the year 1690. It was a small enterprise, but it led the way for a large mill, which was established in Boston about 1730, and proved to be the foundation of an industry having 40 mills or more in operation throughout New England a half century later. Of these it is said that Benjamin Franklin alone established eighteen.

During these times it must be admitted that paper-making struggled along with primitive methods and used extremely crude processes.

In 1799 a machine was invented by Louis Robert, of Essones, in France, and was afterwards improved by Fourdrinier, whose name it has since borne, that gave a powerful impetus to the industry, and in time completely revolutionized it. That machine was the forerunner of the mighty and ponderous mechanism which at the present time strips the timbered areas of the northern zone to furnish paper for half the globe.

Now, having traced step by step the history of the paper industry, shall we for a moment consider the materials entering into the present-day manufacture of this highly important product?

In a world significant at every point with change and decay, there exists a substance, like gold and silver, which is too tough a morsel for time to swallow.

The name of that substance is cellulose. Unlike gold and silver, however, it is the most common of all common substances. When dry it composes over one-third of the total vegetable matter in the world.

Everyone knows that plant life is an organized structure of cells. Sometimes those cells are arranged one way and sometimes another, but, however they are arranged, they form a skeleton of pure cellulose. Take if you will the tiny blade of grass, the close-clinging lichen on the moss-grown trunk, or the gigantic pine that towers like a finger pointing at the clouds, they each and all have the self-same structural basis of cellulose cells. Up through those cells by capillary attraction the chlorophyl and other protoplasmic aggregates go from root to leaves. The wall of each plant cell is cellulose, and each is bound to the other by lignin. How they are built up no one knows. What cellulose is, defies human comprehension. Why cellular arrangement in one way should give a shrub and in another a forest giant, remains an enigma. The chemist, who in his laboratory can analyze and then construct a thousand of the marvels of the universe, in attempting an elucidation of Creation's mystery, batters at the gates of an Eden of knowledge where entrance is denied.

True, we know the empiric formulae of cellulose is $C_6H_{10}O_5$, but that only tells us the atomic proportions of carbon, hydrogen and oxygen entering into its composition. Quantitatively the molecules may be a thousand times greater. Let us say $C_{[illegible]}$, $H_{[illegible]}$, $O_{[illegible]}$, and even the layman knows the infinite configurations possible with 21,000 things. Here we have factories innumerable in which paper, cotton, linen, twine, rope, viscose, celluloid and thousands of the products of cellulose are made, and yet we know pratically nothing about it. Science has laid her hands on what she cannot make, and has robbed nature so that she might build civilization, for civilization has been reared on a paper basis. All the art and learning, the history and the literature, that vast heritage of the past, is borne to us on the written page and in a very true sense present-day achievement in every field of human endeavor has been made possible by, and is forever indebted to an insignificant 'scrap of paper.''

Paper consisting almost entirely of cellulose and cellulose being the chief constituent of all plant life, it has been found in the development of the world's material resources that practically all fibrous substances of the vegetable kingdom can be made into paper. So many factors, however, enter into the industry that only a few can be used upon an economic basis.

In actual practice the raw materials available may be divided into three main groups:

I. Flax, jute, hemp, grass, straw, cornstalks, cotton stems, seed hairs and certain bast fibres.

II. Linen and cotton rags and paper wastes as collected from the four corners of the world.

III. Various kinds of wood—chiefly spruce, hemlock, fir, jack pine and poplar.

The materials of the first group come to the paper maker principally as industrial and agricultural waste. As these materials are little used in Canada, I shall make no lengthy comment upon the methods of their utilization. Suffice it to say that the by-product of our great Western grain fields—I refer to straw—may yet play some part in the paper production of the Dominion. Although for various technical reasons straw cannot begin to compete with wood at seven dollars a cord, the time may come when co-operative straw board factories, such as those of Holland, will prove an economic possibility.

Rags in our second grouping of materials are more than acceptable for the very highest grades of paper. They are not collected in quantities sufficient, however, to approach requirements, and this, together with the question of cost limits their use chiefly to combination with wood pulp.

Wood after all is the cheapest and best material used in the manufacture of paper, owing to its low initial cost, ease of transportation and uniformity of texture. And because wood is the most economical and widely distributed material and water the cheapest power with which to drive the ponderous machinery necessary to the industry, we find the paper manufacturer in a sense a natural monopolist.

In the silent wilds that lie near to Nature's heart, he finds the food to satisfy the maw of his giant revolving wheels, and the streams that gain torrential strength through the very forest he denudes, provide his power. Spruce and hemlock, fir and poplar, dragged from the sombre depths of the wooded hinterland of Ontario and Quebec, are floated down the rivers to the gangways of the mills and form the raw material for a Canadian industry which is destined to be of almost colossal importance.

Before 1860 paper-making materials, as the industry was conducted in America, did not include the woodpulps which now constitute their largest proportion. In 18[illegible] Messrs. Angus, Logan and Company, of Montreal, established what they claim to have been the first pulp mill in Canada and the second in North America at Windsor Mills, P. Q. This Company, which subsequently became the Canada Paper Company still operates the original plant and, so far as I am aware, this is the only large soda-pulp mill in this country. In 1885 the first sulphite mills were built at Cornwall and Merritton, using the Ritter-Kellner system, which was an improvement upon the original invention of C. D. Eckman, the Swedish chemist, who had applied the process at his Bergvik mill in 1874.

During the last quarter of a century, the wood pulp industry has developed by leaps and bounds and the North American continent has become the largest paper producing area in the world. Of the total production of Norway, Sweden, Germany and America, estimated at approximately 5,000,000 tons of mechanical and chemical wood pulp per annum, the United States produces over [illegible] tons and Canada [illegible] tons. As the bulk of the pulp made on this continent is for home consumption, and as the use of paper is in a sense the measure of a people's culture and education, there is perhaps no better yardstick of North American progress than the facts concerning the development of this industry during the last twenty-five years.

In Canada alone the capital invested in pulp and paper manufacture increased from about $[illegible] to over $60,000,000 during the last decade, and the value of the product from $9,000,000 to approximately $28,000,000 per annum. The following statement gives a rough idea of the present utilization of our forest wealth in the manufacture of wood-pulp.

TABLE I.

Pulpwood Manufactured in 1913.

Quantity.
Canada Aggregated 1,109,034 Cords

	Cords
P. Quebec	629,934
P. Ontario	321,244
P. British Columbia	84,173
P. New Brunswick	53,121
P. Nova Scotia	20,562

Kind.

	Cords
Spruce	754,858
Balsam Fir	283,292
Hemlock	47,360
Jack Pine	19,383
Poplar	4,141

TABLE II.

Pulp Produced by Various Processes 1913.

	Tons.
Canada Aggregate	854,624
Mechanical	600,216
Sulphite	183,552
Sulphate	68,284
Soda	2,572

TABLE III.

Unmanufactured Pulpwood Exported 1913.

	Cords.
Canada—Total Cut	2,144,064
Manufactured	1,109,034
Exported	1,035,030

TABLE IV.

Manufactured Wood Pulp Exported 1913.

	Tons.
Canada Aggregate	298,169
To United States	198,110
To Great Britain	92,916
To Japan	7,031
To China	112

The manufacture of newspaper in Canada, requiring approximately 75 per cent of mechanical and 25 per cent chemical wood pulp, amounts to over 1,580 tons per day, or 480,000 tons per annum. The finished product would fill 16,000 standard railway cars every year, making a train over 110 miles long, and requires for its manufacture 600,000 cords of wood, which if the logs were placed end to end, would extend a distance of more than 34,000 miles. Little does the "man-in-the-street" who buys his newspapers without a thought realize that with every single daily issue the printing presses are eating up almost two acres of the primaeval Canadian forest.

Considerable significance attaches to the bald statement that approximately 250,000 acres is annually cut over in order that the necessary wood-pulp may be produced and the question of "conservation" becomes at once a live issue. Under a short-sighted policy in the United States, of cutting all trees irrespective of size, the penalty that follows such wanton destruction is being felt in diminished timber resources, soil erosion, and barren agricultural areas bordering one-time forests. It has been authoritatively stated that within a quarter of the century the pulp and paper mills of New England will all have drifted north from the devastated woods of Maine to the timber areas of Quebec. Our Canadian pulp manufacturers have not been blind to the lesson taught "across the line," and because the pulp mill with its greater capital investment and permanent buildings cannot, like the sawmill, follow up its raw material, a more conservative plan is generally in evidence. Where limits are owned by a company, no trees of less than eifiht inches diameter are usually cut and consequently a perpetual supply is assured and its holdings become a permanent investment. As it takes white spruce only 38 years to reach a diameter of 11 inches; Norway spruce 40 years, and Balsam fir 60 years, the question of forest conservation is not so chimerical an idea as some have thought. A hard and fast rule observed by lumbermen of all classes would help to preserve in perpetuity a large proportion of Canada's 300,000,000 acres of forest domain without occasioning any great hardship to present commercial interests.

Ottawa Notes

Ottawa, Ontario, December 25.—The Supreme Court last week heard two cases in which pulp and paper companies were immediately concerned and reserved judgment in both. One was the case of Whyte vs. the National Paper Company and the other was that of the Barber-Ellis Company vs. the Neostyle Envelope Company.

As regards the first case it appears that a contract had been made between the parties whereby the appellant Whyte, was to receive a commission on all accepted orders for a supply of paper obtained by him in the Province of Ontario except in Ottawa. A contract through his efforts executed between the National Paper Company and the Buntin-Reid Company of Toronto whereby the latter firm agreed to buy and the former agreed to supply within one year a certain kind of paper at a fixed price to the extent of at least $35,000. The National Paper Company admitted and has paid into Court the commission on what was actually ordered and supplied to the Buntin-Reid Company but the appellant sued for the balance of the commission on the whole $35,000. The appellant succeeded at the trial, the trial judge holding that the Buntin-Reid contract constituted an "accepted order" as specified in Whyte's agreement with the paper company. The Appellate Division, however, reversed this judgment on the ground that to carry out such a contract the Buntin-Reid Company had to give orders and specifications from time to time, and these supplementary orders would be the only "accepted orders" on which Whyte was entitled to commission. The case was finally taken, therefore, to the Supreme Court, which has reserved judgment.

* * *

In the case of Barber-Ellis vs. the Neostyle Envelope Company, the Barber-Ellis Company of Brantford received from the Envelope Company a license for the manufacture and sale throughout Canada of envelopes invented by the latter. The envelope was of the style now much used, with a hook to secure the flap at one end. The representations made to the Barber-Ellis Company when the license was granted were, among, others, that it was safe, secure and secret and would carry through the mails two ounces for one cent. By the Post Office regulations any package to be carried at that rate must be prepared so as to be opened for inspection and closed again without injury. On the patented envelope in question being submitted to the Post Office authorities it was ruled that the matter contained therein must pay letter postage. The Barber-Ellis Company thereupon notified the envelope company of this and claimed that the license contract should be rescinded. The respondents refused to concede this and undertook to furnish an envelope which would be within the patent and would satisfy the postal authorities. They did produce an envelope which the authorities accepted, but the appellants refused to continue the contract, and an action for damages was brought. The trial judge held that the modified envelope was outside the terms of the contract and dismissed the action. His judgment was reversed by the Appellate Division, which held that it was within the specifications for the patent and covered by the contract. The respondents, after the contract was repudiated, had granted another license for part of Canada to another company and the Appellate Division held that they had a right to do so. Judgment was reserved by the Supreme Court.

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Manufacturers and employers of labor, including lumbermen and pulp and paper manufacturers, throughout the Ottawa Valley have received from the Provincial Workmen's Compensation Commission the notifications of their assessment to be paid to the commission for the insurance of their workingmen according to the terms of the Workmen's Compensation Act as passed by the Ontario Legislature last session. The enforcement of the act will mean a heavy expense to some of the large lumber and paper firms in Ottawa. The assessment of Mr. J. R. Booth, for instance, is nearly $25,000. His employees come under different rates, the highest being for those employed on construction work, which is fixed at 2.5 per cent of the payroll. Lumberjacks are protected by a 2 per cent tax; sawmill employees by 1.8 per cent; machinists and blacksmiths by 1.5; pulp and paper mill hands by 1.4 and so on. Neither Mr. Booth nor other employers felt disposed to discuss the act at present, stating that they had been represented at the meetings prior to its submission at which the pros and cons were dealt with. Practically every branch of industry has formed a safety association, the object of which will be to minimize accidents. Manufacturers will also carry on a vigorous "safety first" campaign, and will instal every known safeguard in their plants.

In the official circulars sent out it is stated that the amount of the assessment is payable within 15 days from the mailing of the notice, but owing to the exceptional industrial conditions now prevailing an option of paying half the amount now and the remaining half with interest at the rate of 6½ per cent per annum on June 30, 1915, is given.

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Pulp and paper companies holding provincial charters have since the publication of the decision of the Privy Council in the John Deere Plow Company case vs. British Columbia been making haste to apply to the Secretary of State's Department at Ottawa for reincorporation with Dominion powers. A large number of such applications have already been received, but the applicants are in every case being instructed that they must seek new incorporation from the Dominion, the old provincial charter being cancelled, while the firm retains its old name. This is being done to avoid duplication of charters.

The Secretary of State's Department at Ottawa has granted permission to the Chaleur Pulp and Lumber Company, Limited, to change its name to the Cascapedia Pulp and Lumber Company, Limited.

* * *

Mr. John R. Booth, Ottawa's well known pulp and paper manufacturer, last week opened the new wing which he has built for St. Luke's Hospital in this city at a cost of $125,000. Mr. Booth has been a member of the governing board of the institution for many years and his latest gift crowns many benefactions. The new wing is modern in every particular, Mr. John Lumsden, another Ottawa lumberman, having also contributed to it, fitting up the women's ward. H.R.H. the Duke of Connaught presided at the opening ceremony at which Mr. Booth made a short address.

Arundo Donax Cane as a Paper Making Fibre

By JAMES BEVERIDGE.

(Written Specially for Pulp and Paper Magazine.)

The Arundo Donax Cane is a native of South Africa, and grows in that country in abundant quantity. For many years it has been considered a suitable source of paper pulp, owing to its rapid growth, the purity and quality of fibre it yields, and its easy reduction to pulp by any of the well known chemical methods; that is by either the sulphite or soda processes. The cane grows in swampy places and in a season is said to attain a height of from eighteen to twenty feet, and a diameter of from one to one and a half inches. When mature or ripe it assumes a pale golden yellow color, with a clean glossy surface, the outer cuticle, like all canes and straws being of a siliceous nature. It is exceptionally hard and brittle when ripe, and difficult to handle unless crushed between heavy rollers prior to its attaining full maturity and immediately after being cut.

About twenty years ago a shipment of Arunda Donax was subjected by the writer to small and large scale trials with a view to ascertain the paper making qualities of its fibre; the small scale experiments being made to ascertain the yield of fibre by both the sulphite and soda methods.

First: The chopped cane which contained 9.2 per cent of water (dried at 100 deg. C.) was subjected to treatment with bisulphite of magnesia containing 3.47 per cent total SO_2 of which [illegible] per cent existed in the free or combined state. The cane and bisulphite liquor were placed in a covered cylindrical leaden dish and the whole suspended by a stout copper wire inside the upper part of a sulphite wood pulp digester in order that that cooking process in respect to temperature, etc., might be carried out as nearly as possible coincident with the contents of the large digester itself. In this way the contents of the leaden dish were subjected to substantially the same treatment as wood and was not influenced by violent fluctuations usual to small scale digester experiments with the sulphite process. The proportion of bisulphite of magnesia liquor to cane was in slight excess of that actually required for obvious reasons. This, however, according to the writer's experience has little influence on the yield of fibre.

[illegible] batches of cane were operated on [illegible] and the average yield obtained was equivalent to 42.2 per cent of air dry fibre, containing 10 per cent moisture) on the air dry cane (9.2 per cent moisture). The pulp obtained was long, soft and silky in character, slightly brownish in color, but bleached to a pure white with 10.4 per cent of its weight of bleaching powder (35 per cent available chlorine).

There were no difficulties encountered in converting the cane into pulp on the large scale of the sulphite process, the conditions of "cooking" being carried on precisely in the same way as that for spruce wood with the exception that the bisulphite liquor contained a total of 3.74 per cent SO_2, of which 66 per cent existed in the free state, and the base used was magnesia **not** lime. A moderate excess of bisulphite liquor as used in the small scale experiments above mentioned was avoided and in respect to the quality of fibre produced no appreciable difference could be observed between this and that from the small scale trials. The bleached fibre was mixed with sulphite wood pulps and used for the production of high grade printing papers. Generally speaking, the sulphite fibre obtained was long and pliable and possessed of good felting properties.

Second: The raw cane treated by the caustic soda process yielded somewhat similar results. A series of experiments were made with a view to ascertain the necessary amount of caustic, expressed in terms of Na_2O, required to reduce the cane to a satisfactory pulp, that is to say a pulp suitable for the manufacture of high grade papers and sufficiently well boiled to bleach to a high color with a moderate amount of chlorine. It was found that the cane remained hard when digested for 4½ hours at 90 lbs. pressure above atmosphere (which corresponds to a temperature of 331 deg. Centigrade), with 8½ pounds Na_2O in the form of caustic per 100 pounds of cane. This proportion of soda was quite inadequate to reduce the plant to pulp. A second trial in which the proportion of soda was increased to 13.1 parts Na_2O to 100 parts cane, whilst the pressure of 90 lbs. per square inch was maintained for 5 hours instead of 4½, yielded better results. The fibre, nevertheless, remained harsh and wiry to the touch and bleached with great difficulty. Yield 34.45 per cent air dry fibre (10 per cent moisture) on 100 parts air dry cane (9.2 per cent moisture). A third trial, in which the alkali was increased to 24.1 parts Na_2O in the form of caustic to 100 parts of cane, digested under a pressure of 90 lbs. above atmosphere for five hours yielded a fibre satisfactory in every way. Yield 33.1 per cent air dry unbleached pulp (19 per cent moisture) on 100 cane (9.2 per cent moisture). This pulp bleached with 13.6 per cent powder (35 per cent available chlorine).

The conclusions arrived at from these experimental trials were that the Arundo Donax reed or cane yields are entirely satisfactory paper making fibre when converted into pulp by either the sulphite or caustic soda methods of manufacture, but of the two, the sulphite is preferable on account of its cheapness. The proportion of soda required in the alkali treatment is nearly twice that needed for esparto grass or straw and is more than that required for bamboo—a fact which is doubtless due to the greater amount of extractive matter in the Arundo Donax. The fibre as a paper making material ranks higher, in the opinion of the writer, than either megass (crushed sugar cane) or bamboo. It contains less intercellular (non-fibrous) matter than either of these two and in point of purity —although not of strength—resembles the pulp obtained from woods of the pine family.

A Review of the Year in the U.S. Paper Trade

(Specially Written for the Pulp and Paper Magazine)

A price and demand curve of the paper industry of this country during the past year would look something like the cross-section of a tower on a gradually sloping hill. Starting from the summit of the hill and going down at a rather slow gait, one would reach the tower about half way to the base. An elevator travelling at rather high speed would bring one to the top and then a high speed car would be the conveyance across the floor. The far wall of the tower is reached, the explorer stops to take a considerable rest before making the slow and distasteful descent. The bottom of the tower arrived at, one begins a slow walk down the very gradual grade.

In the case of paper and pulp, the year 1914 began with a volume of optimism and hope for good business and high prices. Newsprint contracts were closed at favorable prices. In February the demand for all grades of paper fell off and prices moved downward. March was a poor month, except for news which was drawn on heavily on account of the Mexican war scare. The following months were characterized by a practical state of demoralization especially in tissue and wrapping. Book maintained a fair demand and firm prices.

Pulp and paper stock moved normally on contract during the first two or three months. Then the mills began to make requests for the suspension of shipments indefinitely. A good deal of raw material accumulated and prices went down. Importers were in many instances moving their supplies at a loss. By July the market became attractive because of its deplorable weakness. The mills bought stock at their own prices and rejected large quantities of rags and bagging. It was reported that some of the packers were actually shipping mixed papers to board mills on consignment to be paid at whatever price the mill wished.

In the latter part of July conditions without precedent arose. All Europe was at war and there was a complete tieup in international shipping. The trade did not seem to be prepared for such a climax. Business was very poor at the time this event occurred. Fromretailer to raw material dealer there was a concerted effort to cover supplies. A large percentage of the pulp had not arrived as the importers had placed orders to stop shipments for a time in some cases. Skyrocket prices followed. The mills bought heavily of all kinds of raw material, but they only took orders for immediate shipment and suspended all contracts.

In the course of about six weeks the consumer began to realize that he had stocked up a lot of paper for which he had not immediate use. This was done at the advice of many jobbers. Meanwhile the jobbers continued to cover wherever they could. There was activity at the mills and the purchases of stock continued. When the price of pulp was regarded as too high then the mills sought substitutes in the way of paper stock. Prices went to an unusually high level. Pulp importers who had been losing in some cases as much as $2 a ton on their stocks cleared about $10 a ton.

By the first of October the jobbers found that business was not coming to them and that they had rather large stocks on hand for which they had paid high prices. Mills could not get the orders they solicited and gradually operations dropped off to a percentage ranging from fifty to eighty-five per cent.

Heavy cargoes of pulp, rags and paper stock went to the mills and there was no use for the merchandise. The shippers during the boom had carefully protected themselves by selling all goods "as is" and thus throwing aside all possibility of claims from purchasers as to quality. The close of the year is marked by a large stock on hand at mills and in the warerooms of the jobbing trade, with a poor demand and weak prices for everything. It was the remark of one of the leading dealers in paper mill supplies that mills could now pick up a lot of good stock at very low values.

Pulp prices on contract over the ensuing year may be made at very small advances over the quotations of a year ago. Rag and bagging contracts are possible to be made at remarkably low values with the exception of linens, wool tares and flax which are very scarce. Manila rope was sensationally high during the boom when the price bordered on five cents a pound. It is now practically at normal, 2.75c per pound.

The one market that maintained a firm and healthy tone since the war began is that of ground wood. During the spring, business was poor with the newsprint mills and other consumers of ground wood, and large piles accumulated at the grinding centres. An exceptionally dry summer created a big demand for ground wood. Then came a disastrous fire which destroyed 10,000 tons. The increase in the demand for news on contract during August, when contract consumption advanced as much as forty per cent, led to a heavy demand for this pulp. Prices went up from about $13 to $15 a ton at the mill to nearly $18 with a sharp upward tendency at the end of the year, despite the poor demand.

The newsprint and wrapping situation was materially changed during the year owing to the free entry of these items under the new tariff law. The prices at which contracts for delivery over the past year were rather low. While there have been very few renewals as yet, it is generally conceded that the prices for 1915 delivery will be a little higher than those of last year. How much higher, is a matter of pure conjecture, although those which have come up show an advance of about $1.50 to $2.00 a ton.

With entirely new conditions surrounding the business world of the United States at the beginning of 1915, most people are very optimistic as to the future. There was a large volume of healthy business legislation in the course of the last year. The one thing in which the business world places most confidence is the advance in freight rates given to the railroads at the close of the year. This it is said will put the industrial world on its feet by the reopening of the steel mills and giving employment to hundreds of thousands now idle.

WHO'S WHO IN THE CANADIAN PULP AND PAPER INDUSTRY.

JOHN F. ELLIS

Managing Director, Barber-Ellis, Limited

"At Buckingham Palace I was presented to King Edward and I told him that I always celebrated his birthday—November 9. His Majesty inquired how I happened to do that, and I informed him that it was my birthday also. Then the King became much interested in the matter of our respective ages and I said 'Your Majesty, you look several years younger than you really are.'"

'Thank you,' was the royal reply, 'that is what they all tell me and allow me to extend the same compliment to you.'

The speaker was John F. Ellis, Managing Director and Treasurer of the firm of Barber-Ellis, Limited, Toronto, and he was addressing a gathering at the National Club, after returning home from London, England, in 1906 where he had attended the Sixth Imperial Trade Congress of the Empire as one of the Canadian delegates. In narrating some of the proceedings of that important assembly, Mr. Ellis referred to the fact that several representatives, of whom he had the honor of being one, had been commanded to attend a reception given by the then reigning monarch, Edward the Peacemaker, and incidentally he made the above reference, for although not so old as His Majesty was, Mr. Ellis enjoyed the proud distinction of being born on the late King's Birthday.

After the club dinner was over, a sober-minded Scotch member approached Mr. Ellis and timidly inquired, "Really, Mr. Ellis, did you talk to the King in that strain?"

"Well! what if I did," he ventured, "was it not all right?" "Weel! I dinna ken" was the reply, accompanied by a shrug of the shoulders. Then Mr. Ellis had to explain that he was only indulging in a bit of pleasantry and that neither he nor his remarks were to be taken on all occasions too seriously.

Herein lies a salient feature of the character of John F. Ellis, whose geniality and good nature are proverbial. He is one of Toronto's most progressive and public-spirited citizens and, in his long and active connection of over forty years in the paper trade, has made his own name and that of his firm honored and respected from coast to coast. He began as a paper salesman, later the firm with which he was engaged as accountant got into financial difficulties, and among the heaviest creditors were the Barbers, of Georgetown. This was away back in 1876 and among the men who used to call frequently at the warehouse to dispose of his lines was John R. Barber, who today is continually referred to as the dean of the paper fraternity in Canada, although retiring from business a little over two years ago, after over half a century in the trade. Mr. Barber and Mr. Ellis had become warm friends and the former inquired of the latter how he would like to go into business. Mr. Ellis replied that he would be very pleased to do so if he could secure the necessary finances. This was soon arranged and an offer made for the stock, which was accepted. Thus the firm of Barber and Ellis was launched and has continued ever since, being formed into an incorporated company some years later.

In the partnership, which has existed since June 1, 1876, with Mr. Barber, there has never been a hitch or an unpleasant word. Mr. Barber has for many years had little to do with the business, retaining only the presidency of the company. The place of business was at 53 Yonge Street and they were the only manufacturers of envelopes at that time in Toronto. They were also large importers of book papers from England, and later secured supplies in this line from the United States, being the first house to bring these goods from across the border. About 1880 book, bond, writing and ledger papers began to be made in Canada by the Toronto Paper Manufacturing Company, who established a plant at Cornwall in which Mr. Barber as one of the founders was largely interested.

Gradually American importations were supplanted by papers made in Canada. Owing to expansion of business Barber and Ellis had to secure larger premises and they removed to the corner of Jordan Melinda Streets, where they remained four or five years. They then went into a building of their own on Bay Street, which was five storeys high and in dimensions, 100 x 80 feet affording them about forty thousand square feet for warehouse and manufacturing purposes.

Along came the big fire of 1904 and cleaned them out entirely, their loss being about $125,000 which was only partially covered by insurance. The vault was found ineffective and all the papers and accounts of [illegible] serious predicament, many firms owing the house large amounts and of the various sums they had no records, but Mr. Ellis was not a man to let the outside world know this fact. He sat down and drafted out a blank form which he sent out to the customers with a courteous request that they sign and return as soon as possible. The form read something like this, "As you are well aware out warehouse has been wiped out by fire and it is advisable in the resumption of our business and to materially assist us in straightening out matters, that you kindly confirm the amount of your indebtedness to us and sign the accompanying form at your earliest convenience. Allow us to express our deep appreciation of past favors and to assure you that in a few days we will be able to carry on business as usual." The response was prompt and general, only two debtors failing to send back the certified statements.

But that was not all. The morning after the disaster everybody was scurrying around for new quarters which were at a premium. Before going down town Mr. Ellis secured the Granite rink for the summer months and thus had new premises before the conflagration was extinguished. Then when winter was approaching, he moved the business into an unused church on Alexander Street. The next spring Barber-Ellis came down to York Street where they found a suitable location for warehousing and storage. For manufacturing purposes a factory in Brantford was bought, Mr. Ellis already being interested in the Brantford Box Company in that city. Disposing of this business to the Barber-Ellis Company, the two were merged and three years ago a fine, large new factory, well equipped and excellently appointed, was erected, with a capacity of a million and a half envelopes a day. The making of boxes, papetries, printing and embossing are also conducted on a large scale and all lines now used in the production of these goods are either made in Canada or imported from England. Later their Toronto quarters were removed to 71 Wellington Street West where a heavy stock is carried and a wide business done in book, bond, writing and ledger papers as well as envelopes, papetries, tablets, etc. Seven years ago business grew so extensively in the West that a warehouse was opened in Winnipeg, of which Mr. Wallace Murphy is manager and from that point Manitoba and Saskatchewan are looked after. Over two years ago expansion became necessary and a branch was established in Vancouver where a representative stock is carried under the joint management of Garfield and Lorne Graham. Last year Calgary was selected as another point in the West and the firm of Barber, Ellis, Davis, Limited, formed, of which W. R. Davis, a paper man of long experience is in charge, this being a subsidiary company.

In connection with the business twelve travellers are employed covering the Dominion from the Atlantic to the Pacific. Mr. Ellis has three sons associated with him, F. M. and C. G. looking after the manufacturing in Brantford, where sixty thousand square feet of floor space is used while another son, E. H. is connected with the operations of the company in Toronto.

It may be here remarked that Mr. Ellis, who is now in his seventieth year intends taking things a little easier after his long and strenuous career in the trade, and the buying and selling ends having become so heavy, his eldest son F. M. is removing from Brantford to assist him in the management and assume part of the onerous executive work, while C. G. Ellis will be in charge of the plant in the Telephone City.

Barber-Ellis, Limited buy a large portion of the output of many Canadian and Old Country mills, which lines of paper are used, not only in connection with their extensive wholesale business, but in the making of envelopes, tablets, papetries, etc. Some idea of the enormity of their output may be gauged from the fact, that in their Brantford factory, over three hundred million envelopes were turned out during the past year.

Outside of business, Mr. Ellis has devoted time and attention to many important projects and public spirited undertakings, and during his tenure of office all these organizations and movements have been imbued with new life and energy. A member of the Canadian Manufacturers' Association, when its vitality was at a rather low ebb, he was elected president a few years ago. On his inception the membership was about one hundred and fifty and when he retired it had grown to over a thousand. A past president of the Toronto Board of Trade, in which he has long been an influential factor, he was one of the delegates to the great Imperial Trade Congress in London, England, in 1896, and had the pleasure and honor of moving the resolution in favor of penny postage throughout the British Empire, which was ushered in a year or two later. One of the founders of the Commercial Travelers Association, a former president of the National Club and one of the honorary governors of the Toronto General Hospital he has also taken a deep interest in charitable and philantrophic endeavors. In a word, the thoroughness and efficiency of his work are the best evidences of his worth as a citizen and of his sound judgment and administrative capacity in all business affairs.

Talc in Paper-Making

Sugar papers treated with talc give from 60 to 80 per cent. ash, so that talc is preferable to kaolin. Talc also covers better and is more economical than blanc fixe.

Mill Finished Papers.—Provided the raw material has been well prepared and sufficiently sized, talc has always given good results on mill-finished papers.

Colored Papers.—The shade of colored papers prepared with talc is more pronounced and the glazing better than those treated with other minerals.

Wall Papers.—Talc entirely prevents transparency when a new wall paper is placed over an old one.

Heliographic Papers.—Talc is not only employed as an addition in the pulp, but also to give photographic papers a special surface.

Paper for Poly-Copies.—Talc is very useful as a raw material. So far it has not been tried for re-copying papers, but it facilitates the loading of duplex papers.

Hectographic Papers.—The employment of talc is very advantageous in these qualities.

Impregnated Papers.—As talc resists the effect of air and moisture, it can be advantageously employed for papers used for preserving purposes. Talc added to salicylic acid is a good preservative. It is also useful in the production of rain-proof pasteboards.

Grease-Proof Papers.—In certain mills talc is used in the production of these papers. The quantity of the loading depends on the thickness and the purpose for which the paper is to be employed.

Crepe Papers.—The addition of a little talc to these papers imparts a suppleness, but it must not be used for Chinese fibre papers.

Tissue Papers.—Talc is an important factor in the preparation of silk papers made from wood pulp to replace the thin rag papers, as it is the only mineral that helps to produce the appearance of a rag paper. It diminishes the silky appearance, and increases the opacity.

Thick Papers.—For certain paste boards and thick papers talc is useful as it imparts moist-resisting properties. This is particularly the case with highly-glazed papers.

Paste Boards.—Talc gives the paste board a certain strength, and prevents it from breaking when being cut. Talc is therefore a useful addition in the manufacture of playing cards. It can be used for most kinds of paste boards. Added in proper quantities to the beaters, it imparts a special surface and advantageously influences the coloring. In certain cases talc can replace asbestos for packing steam joints. Mixed with sulphite, a paste board can be made which can be used for boiler joints. The pulp so prepared is practically indestructible, whereas pasteboard made without talc requires to be replaced at each boiling. Talc prepared paste board has also been used to replace the rubber parts of a hydraulic press with most satisfactory results.

Papier-Mache.—Different trials made with talc have given good results in the making of papier mache. This specially applies to papers used for cartridge tubes and receptacles of all kinds.

Influence of Talc in Manufactured Paper.

Finishing and Coloring.—Papers and paste boards containing talc acquire a very high surface. Printing papers made from a mixture of 80 per cent fresh mechanical pulp and 20 per cent wood pulp can be sized with talc bound with about ¼ per cent potato starch, after the pulp has been well [illegible] with sulphate of alumina. This treatment fulfils all conditions required for a good sizing of newspaper paper of average weight whilst a great economy of rosin and alum is effected.

Mineral Loadings.—For papers requiring a good sizing it is generally advisable to add talc after the sizing has taken place. Good writings have been obtained, however, by adding first in the beater the solution of sulphate of alumina, then the talc, and finally, just before emptying, the cold-sizing milk. The loading waste is generally less if the talc is added before the size.

Whiteness.—An addition of talc imparts a whiteness to raw sulphite pulp or lightly bleached fibrous matter, equal to that of highly white pulps.

Flatness.—Talc gives a perfect flatness to paper which no other mineral enables it to obtain. It prevents the paper from shrinking after the damping and during the calendering.

Use of [illegible].—As already stated talc is the best means of protection against the pressure or dust in papers made from cylinder machines. It is only thus that lithographic papers can be produced which will not damage the surface of stones.

Talc as a Substitute for Rosin.—It has been generally admitted that Americans were the only manufacturers able to produce news paper without rosin, as the pulp they employed contained natural colloidal rosin, so that the only additions they required was asbestos or talc. Papers free from mechanical pulp, not sized, have been very successfully produced in European mills, however, for the production of the most finished printings, and especially the famous Oxford paper.

The fundamental basis of this manufacture resides in the employment of minerals, of which talc is the chief, for the following reasons: The more the surface is able to absorb color the less ink and coloring impregnants (such as turpentine) are required, and less pressure is needed at the moment of receiving the color; talc is the finest distributor, and adheres equally to the small fibres and prevents irregularities of the surface of the paper. When the printing is done properly, the finest lines appear neatly on the paper. In these conditions high-priced rosins can be totally or partly dispensed with, according to the nature of the pulp.

Talc prevents colors from appearing in transparency when printed on thin Oxford papers.

Employment of Talc in Scandinavia.

In an important Scandinavian mill, where Chinese and Japanese absorbent paper is made with Styrian talc, a test revealed that from 90 to 95 per cent of the talc remained in the paper. The results were obtained without the addition of potato starch.

The papers containing talc commanded a price almost equal to that of very high quality paper. They were suitable for pen and brush writing, and their whiteness and purity and entire absence of sand brought them into favor and created a demand. They were also easily worked on the machine, and the sheet did not adhere to the presses as when potato starch was used. Moreover, the felts and wire did not get dirty so quickly as when potato starch was used, and the life of the felts and wires was longer, and depreciation considerably lessened.

The greasiness of talc enables it to be absorbed at a higher grade than any other loadings, and it gives more resistance to the structure of the paper, of which it suppresses the roughness.

Advantages of Talc.

Before the employment of chlorine for bleaching, the whiteness of the papers was augmented by the use of minerals that answered the purpose on account of their own whiteness and covering qualities. These mineral matters gave more brightness to the white rag shade, and thus increased its white appearance.

About the middle of last century Belgian paper-makers, and later on Germans, produced papers strongly loaded with mineral matters. These papers were soon greatly in demand. Later still, the making of mechanical pulp supplied a cheap raw material, but the papers containing such pulp were not liked, and the prejudice was justified through the want of technical experience at the beginning.

Chemical pulp then made its appearance, and in this the defibred wood found a valuable auxiliary. The chemical and mechanical fibres were felted together in a very advantageous way on the machine, though a third substance was wanted to fill up the pores and empty spaces of the mechanical pulp, as this by itself has very little suppleness. Talc, together with the mineral loadings and rosin size, produces an even web. The paper loses its woody character and acquires the appearance and touch of rag paper.

The obstacles that the new method often met with must be attributed to wrong treatment. In some cases the quantity of loading or mechanical pulp added to the rags or wood pulp was too heavy; in other instances the addition was too small or the material was unsatisfactory, or the workmen were too inexperienced.

All minerals used as loadings before the employment of talc have shown their defects. Lime sulphates, though pure and white, remained in a small proportion only in the paper. The asbestine imported from America, which is a kind of silicious magnesia, has given fairly good results, but its dryness and rough touch made it objectioable.

Talc, which is also a silicious magnesia, but free of iron, sand and chalk, answers all requirements as the smoothest loading material and the softest to the touch.

—Taken from claims of Austrian talc producers.

PULP FAMINE FEARED IN JAPAN.

Extracts from Japanese newspapers supplied to the United States Bureau of Foreign and Domestic Commerce by the Consul-General at Yokohama indicate that, as a result of the war in Europe, the imports of wood pulp into Japan have been totally suspended. Pulp has hitherto been imported from Norway and Sweden in large quantities. Stocks of pulp held by various paper mills in Japan would, it was feared, be exhausted in three or four months, and because of this the companies are now considering measures to meet the situation. Quotations have risen by 10 per cent and are expected to show a further rise in the near future. It is, however, reassuring to know that the Fuji, Oji, Chuyetsu, Kiso, and other mills are now making pulp.

Owing to the increased price of pulp, those paper mills using imported pulp have increased their prices for paper. The Japanese mills now have prospects of closing down as soon as their present scanty stocks are used. A group interested in paper-making is projecting the establishment of a pulp-making plant in Karafuto (Sakhalin) large enough to supply about one-third of Japan's normal consumption. It was expected that the company would be able to begin operations about next March, provided the machinery and plant ordered from Europe would not be delayed in transmission. A serious crisis in the paper market is to be looked for, it is stated, between Christmas and spring unless the situation changes.

MR. J. E. A. DUBUC NEW MANAGER.

The St. Lawrence Pulp and Lumber Corporation of Chandler, Que., has passed into new hands, as was outlined in these columns a short time ago. The new General Manager is Mr. J. E. A. Dubuc, General Manager of La Compagnie de Pulpe de Chicoutimi. A considerable number of men were discharged pending construction, it is understood, but work is still going forward.

Mr. Dubuc said to the Pulp and Paper Magazine:—"I have taken over, as General Manager, this plant. Every possible diligence is being made this winter to have the plant completed and we hope ready to run by next March."

BRITISH TRADE NEWS

SPECIAL TO PULP & PAPER MAGAZINE

According to information which has reached London from an authoritative source, the German paper industry is not enjoying the prosperity some people would lead us to believe. At the beginning of September when there was a rush for paper and boards for the Teutonic army and navy, unemployment was high, and this means that the output of mills was considerably reduced. The official German reports put unemployment at 22.4 per cent, though hundreds of thousands of workmen have been called to the colors for the war. In times of peace the highest percentage of unemployment is on an average 4.8 per cent. The chemical and paper industries are amongst seven of the principal industries that have suffered the greatest losses, but the losses have been somewhat reduced by the government orders. For instance, cardboard manufacturers are producing boxes for wrapping food in and other articles for soldiers at the front. Taking paper, boards, cards, etc., the export in 1913 reached £13,250,000 (or 265 million marks), and since August last the exports of Germany have been practically reduced. The disorganization, according to the Dutch press, is worse than what was experienced in 1870-71 during the Franco-German war, and this state of affairs is causing great efforts to be made in the way of introducing organization to meet the disorganization. As another instance of organization, a typewriter factory supplies the military with bicycles, and chemical works producing dyes are now making pharmaceutical articles, coffee and beef tea tablets. Mr. J. Bourne, secretary to the National Union of Paper Works at Maidstone, Kent (England), in a speech the other day said: "What was the position in England to-day? We have about 200 mills at work, Scotland about 60, Ireland 8 or 10. Taking the United Kingdom we have 270 mills at work. Germany had nearly 1,000, but what would be the position of the German paper trade before the war was over? It would be scattered for some one to pick up." There is no denying the fact—and the fact defies contradiction—that Germany is knocked out of her best markets in the world at present, and when the war is over she will resort to her old game of underselling and undercutting prices to regain a footing once more [illegible] and other paper producing countries.

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The Trade Board figures showing the imports of all kinds of paper, straw, mill, paste, and wood pulp boards, together with the state of the export trade in November, and for the eleven months ending November, are as follows:

	November.		January-November.	
	1913	1914	1913	1914
	Cwts.	Cwts.	Cwts.	Cwts.
Imports	[illegible]	[illegible]	[illegible]	[illegible]
Exports	[illegible]	[illegible]	[illegible]	[illegible]

Reel paper from Newfoundland fell from 110,023 cwts. in 1913 to [illegible] cwts., the eleven months' figures being [illegible] cwts., compared with [illegible] cwts. for the same period in 1913. During November reel paper for printing rose by [illegible] cwts. over November 1913, which is attributable to the buying in September and October, when the Canadian mills were asked for supplies. Supplies from other countries show a considerable reduction. Shipments of paper not on reels for printing from Scandinavia rose in November by 4,789 cwts. Paper hangings fell away to 456 cwts. from all countries. Coated papers are also substantially reduced. Large supplies of kraft papers were imported from Russia and Scandinavia — particularly Russia and Norway. The supplies were: Russia, 24,367 cwts.; Sweden, 104,837 cwts.; Norway, 129,502 cwts. England is still receiving large quantities of paper and pulp from Russia, notwithstanding rumors to the contrary in America. In the export trade the following figures show the position of things: Writing paper was shipped to the extent of 15,973 cwts., as against 18,191 cwts in November 1913 (342 cwts. going to Canada, a reduction of 113 cwts.); printing paper to the extent of 127,599 cwts., as against 133,963 cwts. (7,410 cwts. going to Canada, a reduction of 3,205 cwts.); unenumerated, 4,075 cwts., as against 5,192 cwts. (62 cwts. going to Canada, a reduction of 89 cwts). All supplies of paper to the States show a reduction. Fine papers, of course, are only shipped to Canada. The pulp imports were as follows in tons:—

	November.		January-November.	
	1913.	1914.	1913.	1914.
Chemical	39,014	38,472	355,949	390,517
Ground Wood	40,006	33,167	512,989	524,527

A total of 79,020 tons in November 1913, compared with 71,639 tons in November 1914, and 915,044 tons during January-November 1914 as against [illegible] tons for same period in 1913. No Canadian shipments of ground wood reached England in November, but of course September and October were heavy months.

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On inquiring at the Barrow Works of the Kellner-Partington Paper Pulp Co., the manager stated that the last cargo of pulp wood which landed for the company came from Archangel. The only complaint heard was the shortage of labor due to men being at the war. This difficulty, however, is soon being overcome. The company are dependent on a sufficient supply of pulp wood, all of which comes from the east side of the North sea and they also rely on an unhampered line of shipping to deliver exportations which claim a big amount of their output. The manager (Mr. Bradbury) is naturally quite proud of the work the British Navy is doing for his mill by protecting all shipping for the mill. Mr. Bradbury replied in the negative when asked if any trade in the paper line which Germany might be deprived of in consequence of the war would benefit his mills. "Germany," he said, "sends a good deal of colored paper into this country. We do no color material at Barrow, but only white printings." The report of the Kellner-Partington Paper Pulp Co. for the year ended September announces profits of £385,279. Profits in previous years were as follows:—1912-13 £404,852; 1911-12, £346,154; 1910-11, £344,809; 1909-10, £333,800. For the past five years (including this year) a dividend of 20 per cent has been paid. This year £67,937 has been carried forward as against [illegible] in 1912-13.

Paper exports from Belgium, Germany, Austria and part of France are cut out of the world's markets. Under the circumstances it seems strange that the British mills, which have the advantage of shipping—though at higher insurance and at war risks—cannot show an increase in the export trade. Practically since September 1913, the exports of British paper mills have been depressed on expert account; still all the mills in 1914 have paid their shareholders good dividends, which may be accounted for by the increased domestic consumption. Large discoveries of talc have been made in South Africa and it can be sold cheaper in London than any other mine or firm can dispose of it.

Mineral white contracts were made in December in London, on the same basis as 1914 prices, but contracts entered into now are dearer from the buyers' view point.

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Sir Edward Partington, chairman of the Kellner-Partington Paper Pulp Co., has stated that the Austrian Works of his company in which about £800,000 of the company's money had been sunk, included a deal of freehold property in the shape of forests. The Austrian government were doing all they could to preserve the property in the company's interest. It is difficult, he added, to prophesy as to the future.

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The Amalgamated Press, Ltd., of London, which is interested in the Imperial Paper Mills, Gravesend, Kent, and the Anglo-Newfoundland Develop. Co., as well as the "Daily Mail," has made a net profit of £329,300 for the past year. This includes three months of the war, and a dividend of 40 per cent has been paid.

* * *

Advices reached London on December 16 that the paper mill at Diest, near Louvain, has been bombarded and destroyed by the German army, because the owners refused to work for the Kaiser or the Crown Prince, who was present in the town at the time. 280 houses in the same vicinity were also destroyed.

RE "PIT PROPS."

Referring to our article on "Pit Props" published in this Journal under date November 15th, it was not made quite clear that the number of pieces of wood of different diameters which go to make up a cord and cubic fathom as given in the table, were pieces 8 feet in length—not 4 feet, as originally given by the late Mr. H. M. Price. Readers will please be good enough to note this correction.

AT THE NEW BATHURST PLANT.

Mr. Frank Spear, of the St. Lawrence Pulp and Lumber Corporation at Chandler, has been appointed master mechanic on the Bathurst Lumber Company's pulp mill staff.

The equipment for the plant is now beginning to arrive, and installation of machinery will begin about February 1st.

ANNUAL MEETING OF CANADIAN FORESTRY ASSOCIATION.

Notices have been sent out by Mr. James Lawler, Secretary of the Canadian Forestry Association, as follow:—

The sixteenth annual business meeting of the Canadian Forestry Association for the consideration of reports, passing of accounts, dealing with business arising out of the same, the election of officers, and such other business as may properly come before it, will be held in the assembly hall of the Carnegie Public Library, Ottawa, on Tuesday, January 19th, at 8 o'clock p.m.

All members in good standing are eligible to attend and vote. Members having business to bring before the meeting should communicate with the Secretary as early as possible.

Though the war takes up most of the national attention and energy, yet work so vital to the continued well-being of the nation as the protection of our natural resources should be pressed forward as vigorously as circumstances permit, so that after the war our people will have the raw material out of which to build up renewed prosperity. All who can attend and take part are therefore requested to do so. The Commission of Conservation holds its Annual Meeting on the mornings and afternoons of January 19th and 20th, in its offices opposite the Carnegie Library, so that those attending can participate in both meetings.

PARCHMENT WRAPPING PAPER.

Mr. D. H. Ross, Melbourne, informs the Department of Trade and Commerce that he has been in receipt of a number of inquiries respecting parchment paper suitable for lining butter boxes used for the export trade. During 1913 Australia imported parchment paper to the value of £25,128, of which Germany supplied £18,184 and Belgium £4,736; or in other words, these two countries practically supplied the whole. These supplies having been cut off for even the present season, importers are as a consequence turning their attention to the United States and Canada for their requirements.

A reference to parchment wrapping paper appeared in Weekly Report No. 322, and the principal sizes of the paper used by the butter factories were there given as follows:—

48-in. x 12-in.—Weight 30 to 32 lbs. per ream.
30-in. x 20-in.—Weight 20 to 22 lbs. per ream.

The demand is obviously for these sizes, but if other sizes were shipped they could be cut up to the required sizes on arrival in Australia.

Canadian makers who may be interested should waste no time in taking the proper steps to secure the business that is offering. Quotations should be c.i.f. (or preferably c.i.f. and e.). In the notice in Weekly Report No. 322, above referred to, the following were given as samples of January, 1910, quotations:—

F.O.B., Antwerp, £27 2s 6d (freight likely £1 5s 0d).
London quote c.i.f., £28 15s 0d (ex-ship Melbourne).

A sample of the quality desired can be obtained by Canadian manufacturers upon application to the Department of Trade and Commerce, Ottawa. (Refer to file No. A 1246.)

UNITED STATES NOTES

(Special to Pulp and Paper Magazine).

Now that many newsprint contracts are running out and mills are out for renewals, it seems likely that the advance in price will be much less than was anticipated when the war broke out, and the semi boom conditions of August prevailed. The demand for newsprint in the United States is still in excess of what it was a year ago, and the newsprint industry is one of the comparatively few which has been directly stimulated by war conditions. October and November increases, however, are understood to have been by 10 per cent. ahead of last year, whereas August showed a 30 per cent. gain, and September around 20 per cent. Basic conditions are such that newsprint producers will naturally require somewhat higher prices, and would be justified in asking more than they will. But the position of big producers like the International Paper Co. is that the publishers of the country are meeting with a big drop in sale of their advertising space, and have had to stand a big additional burden of getting news. Experts look for contract renewals on a basis of 2.10 to 2.20 for the most part.

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Before leaving for the West on a business trip, President Arthur C. Hastings, of the American Writing Paper Co., Holyoke, Mass., said that there would be quite a few changes at the American Writing Paper Company, which would be announced within the next few days. One important change which has been made so far took place Saturday, when Arthur J. Dougherty, manager of the Nonotuck division of the company, was transferred to the sales department at the central office of the company. Mr. Dougherty is one of the company's most efficient and faithful employees, and the promotion is a well merited one.

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William T. Richards, president of the Erving paper mills in Erving, Mass., has sold his interest to Edward Blake, Jr., formerly of Greenfield, and until recently manager of the J. P. Slocomb Company, Providence, R.I. Mr. Blake will engage in the management of the company. Mr Richards who is a selectman of Erving, is not ready to announce his plans yet.

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A party of about 15 American and Canadian paper makers who have specialized in the various branches of paper manufacture, have been engaged by the Chinese Government to take charge of a new paper mill which the government has erected at Hankow. The party sailed from San Francisco, Cal., on the SS Nipon Maru, on December 26, for the Orient.

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Importations of bleaching powder into the United States for October amounted to 1,986,734 pounds, valued at $20,454 compared with 4,686,533 pounds valued at $37,947, for the same month last year. Importations for the months ending with October were 31,1[illegible] pounds valued at $298,759 compared with 52,115,357 pounds, valued at $429,624 and 61,971,608 pounds, valued at $496,258 for similar periods in 1913 and 1912 respectively. Sellers of bleach are holding the item at present at 1½c. a pound on spot.

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Announcement was made during the past week in the New York Trade that John J. Holden, of Charles F. Hubbs and Co., of Fourth and Lafayette Streets, will be associated with Steffanson and Co., pulp importers, of 30 East Forty-second street. Mr. Holden is well known to the pulp and paper trades, having had long connection with it. He has been active in the local trade for nearly 30 years.

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It is expected that the new sulphite mill of the Penobscot Chemical Fibre Co. at Great Works, Me., will be completed in time to begin manufacturing pulp some time in May or June, 1915, thus giving employment to several hundred more men. This prospect has already resulted in a miniature building boom in this section. W. S. Haley, of New York, is at present in charge of installing the acid machinery for the new sulphite mill.

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Professor W. G. Durgin, of the University of Maine, Orono, Me., who has charge of the work in pulp making done by the department of chemistry, is making arrangements for further co-operation between the university and paper mills of New England. Last summer several students of chemistry spent their vacations in the same way. Mills at South Brewer and Old Town, Me., permit the students to work through the various departments as spare "hands." Other mills that admit students are situated in New Hampshire, New York, and Pennsylvania. The work done by the students in the mills amplifies the theoretical training they get at the university, and helps prepare them for advanced work when they are graduated.

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After being held up on the docks at Rotterdam, Holland, for about six weeks a large consignment of high grade tissue paper has just been received at Appleton, Wis., from Germany, by the Tuttle Press Company. The paper was loaded in Germany on July 27, and reached the coast at about the time war was declared. The paper is of a grade not manufactured in this country, and the consignment is valued at about $3,500.

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The Chief Forester of the United States submitted his report for the year to Congress last week. The part of the report dealing with pulp and paper investigations follows:

"Newsprint paper has been made at the Forest Products Laboratory from twenty-four different woods, more than half of which are important National Forest species. Most of these papers have been subjected to commercial tests by newspaper publishers. A number compare favorably with the standard spruce newsprint now in general use. Exceptionally strong pulps suitable for wrapping paper were made from southern pines by the sulphate process. Loblolly and longleaf pine bid fair to become standard materials for the manufacture of "kraft" pulps, used in making high-grade wrapping paper. Enormous quantities of such paper are now imported by the United States. Its manufacture from mill and logging waste and stumps in the southern states should establish a promising industry."

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McPherson, Kan., will in the near future establish a paper pulp mill. Frank A. Wilbur, representative of a paper mill in Lafayette, Ind., spent some time there interesting the business men, and representatives will go to the factory and look up the other end, make the final arrangements. It is estimated that a ton of straw is taken from the field for every 10 bushels of wheat, as the price of straw is about $5 a ton, the mill will not necessarily depend on local conditions for operating steadily.

* * *

Stuart D. Lansing, vice-president of the Bagley and Sewall Company, of Watertown, N.Y., has received word that the paper makers who left his city on Nov. 19, and sailed from New York, Nov. 21, on the French line steamship La Touraine, for France, had arrived safely at their destination, Nanterre, and assumed their duties in the mill of Papeterie de la Seine.

* * *

In the year 1909, 777 establishments were engaged in the United States in the manufacture of paper from wood pulp. These gave employment to an average of 81,473 persons, and paid $50,314,643 in salaries and wages.

HINTS ON THE THEORY OF THE BEATER ENGINE.

In theoretical considerations, which have hitherto been made on the operation of the beater engine, one extremely important point has not been given sufficient attention, namely, the density of the pulp and its relation to the work of the beater. To obtain a proper idea of the processes in beating, the disintegration, and the transport of the pulp by the roll must be considered separately, always with a view to the influence of the density of the pulp.

If the beater roll stands still, the contents of the trough will remain at rest. When the beater trough contains water only, the level of the latter will be of the same height everywhere; if, however, the trough contains pulp, the surface of the latter will, even after the roll has been stopped, be more or less inclined, and this inclination will be the greater the thicker the pulp, i.e., the greater the density. The density of the pulp (sp) will thus have an influence on the level of the pulp already while the machine is standing still, When the pulp is in motion it will undergo a friction against the walls of the trough, the wetted surface of which we shall indicate by the letter (u) and the length of which by the letter (l). This friction will differ according to the smaller or larger cross-section (F) of the pulp.

If we now attempt to move the pulp, for instance, by means of a paddle, it will rise higher at a rapid advance than at a slow advance—in other words, the resistances against the motion in the beater are in a certain relation to the velocity of the pulp (v.) For overcoming these resistances there must be a drop (hw) in the level of the pulp circulating in the beater, and this drop depends on all the above-mentioned factors, and may be expressed by the following formula, which expresses all that been said above:—

$$hw = f. (sp \times u \times l \times F \times v).$$

This value (hw) does not always correspond to the difference between the levels of the pulp in front and behind the roll, as the section of the passages through which the pulp has to flow is not everywhere the same. If, in particular, it be remembered that the bottom of the trough rises in front of the roll, but that there must always exist a drop when the pulp flows towards the roll, the pulp section in front of the roll must decrease more and more, and the pulp must flow faster and faster. It is obvious that the drop will be different when the density of the pulp is a different one, so that a beater which works excellently at a given density of the pulp entirely fails under otherwise equal conditions with a different pulp density. Experiments which went as far as a pulp density of 5 per cent showed that the factors mentioned have a numerical influence, and that it is possible to find by calculation the best suited shapes of the troughs, which have already been suggested by some beater manufacturers by instinct, so to speak.

In considering the roll, it must not be forgotten that it must deliver on the one side as much pulp as it takes up on the other, but that this quantity of pulp must again be exactly equal to that quantity which will flow within the time unit through any sectional area of the beater trough. There exists thus an inseparable relation between the circulation of the pulp in the trough and the feed of the pulp by the roll. It is obvious that the density of the pulp will, in this regard, be of the greatest importance, if, for instance, the pulp is assumed once very thin, and again very thick. In the latter instance the inertia of the pulp may be so great that far too little pulp enters into the cells of the roll for a noticeable circulation to be caused.

It is therefore possible to recognize, without the aid of mathematics, that there exists a given circumferential velocity of the roll for every beater and for every pulp density, at which velocity the best circulation of the pulp will be obtained. Also the shape of the backfall and its distance from the roll must depend on the density of the pulp, as on it again depends the quantity of pulp which is delivered by the roll. Is it thus not obvious that it is impossible to obtain a reliable calculation of the processes of motion in the beater without considering the density of the pulp?

Disintegration in the beater we may assume to be the result of a kind of friction between the roll and the bed-plate, and of the fibres being squeezed between the blades of the bed-plate and of the roll. Only the fibres which are seized between these two sets of blades are worked, squeezed, disintegrated. In this treatment only the specific pressure on the fibres themselves, not the specific pressure between the blades, comes into question. With a thicker pulp, under otherwise equal conditions, more fibres will be simultaneously seized as with a thinner pulp, and thereby the degree of the treatment will be considerably influenced—in other words, the pressure between the thick roll and the bed-plate will, with a thicker pulp, be distributed to more, with a thinner pulp to fewer, fibres, and thereby the quality of the finished stuff is determined. We thus see that not only the circulation of the pulp but also the disintegration greatly depends on the density of the pulp.—Papier Zeitung.

PULP AND PAPER NEWS

Ritchie and Ramsay, coated paper manufacturers, Toronto, have removed their offices and stock rooms from the top floor of the Ogilvie Building at the corner of Wellington and Bay Streets, to the second floor of the Jessop Building at 80 Bay Street, where they have splendidly fitted up quarters.

* * *

Many friends in the trade have learned with regret of the death of Robert Aitken, who was for over twenty years in the employ of the Canada Paper Co. at Windsor Mills, being superintendent for a long time. A few months ago Mr. Aitken resigned owing to failing health and left for his old home in Scotland. He passed away recently at Brechin in his fifty-second year, from an attack of pleurisy. He leaves a wife, one son and one daughter to mourn his loss.

* * *

An application has been granted for the sale of the Vancouver World, on behalf of the debenture holders, as the business is said to be hopelessly insolvent. For some years the affairs of the company have been in the hands of a receiver. The World was established twenty-seven years ago.

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It is reported that the Canadian Pacific Mills, Limited, which was recently organized with a capital of $9,500,000 and took over the property of the Ocean Falls Co. at Ocean Falls, B.C., will erect a large paper mill.

* * *

The British Columbia Sulphite Fibre Co., whose plant is located at Mill Creek, Howe Island, and is making sixty-five tons of sulphite daily, recently purchased two hundred million feet of hemlock and spruce timber from the British Columbia Department of Lands consisting of eight parcels. The company are selling a large part of their output to Japan, South America and the Northwestern States. The plant is at present undergoing extensive alterations.

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Alex. Annandale, formerly physical adviser for the Canada Paper Co., Windsor Mills, Que., has taken a position with the Provincial Paper Mills Co., and is now attached to the staff of the Barber paper mill at Georgetown, Ont.

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Alex Taylor, of Toronto, assistant secretary of the Spanish River Pulp and Paper Mills Co., Limited, has gone on a business trip to the Old Country.

* * *

William Antoine and Baptist [illegible], who were employees of Provincial Mills Co. at Mille Roches, Ont., were drowned recently while crossing in a boat to Barnhart Island in the St. Lawrence. A lantern on the bow of the craft upset, and in an attempt to right it, the boat capsized, and the two men as well as the wife and two children of Antoine were drowned. The catastrophe threw a gloom among all the employees of the plant which closed down in order that all hands might attend the funeral of the five victims.

William N. Hurlbut was married in St. Paul's Church, Toronto, on December 19 to Miss Erna Hornig of New York City, formerly of Toronto. The happy couple will reside at Sault Ste. Marie, Ont., where Mr. Hurlbut is assistant to C. H. L. Jones, manager of the Spanish River Pulp and Paper Co., Limited. He is a son of W. D. Hurlbut of Chicago, Traffic Manager of the Wisconsin Pulp and Paper Mills Traffic Association, and began his connection with the pulp and paper trade with the Minnesota and Ontario Power Co. at International Falls. Afterwards he was with the Fibre Products Co. of Cornell, Wis., and in 1911 came to Toronto as assistant traffic and sales manager of the Spanish River Pulp and Paper Mills, and was later assistant to T. H. Watson, Managing Director of the company. A few months ago Mr. Hurlbut was removed to Sault Ste. Marie to enter upon his present position.

* * *

All the manufacturers in Ontario have been notified by the Board of the Workmen's Compensation Act of the assessment what they will have to pay for compensation purposes, and it is not expected that the Board will have much trouble in collecting the assessments. In fact, the response has been very prompt and general and does not give evidence of any financial stringency. The regulations require the assessment to be paid within fifteen days. Only a small number of manufacturers and employers are taking advantage of paying their assessment in two installments, as most of the cheques received are for the entire amount.

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W. G. Jaffray has been appointed President of the Globe Printing Co., Toronto, succeeding his father, the late Senator Jaffray, who passed away recently in his eighty-third year and was President of the Globe for many years.

* * *

Hon. G. Howard Ferguson, M.P.P. for Grenville, has been appointed Minister of Lands, Forests and Mines for the province of Ontario succeeding Premier Hearst who has administered that department for a number of years. Mr. Hearst will, however, retain the Northern Ontario Development branch, which will be detached from the Department of Lands, Forests and Mines.

* * *

Under the reductions in rates, which have just been granted by the Ontario Hydro-Electric Commission, there will be a decrease of twenty-five per cent. to the municipality of Port Arthur, which is endeavoring to secure a pulp and paper mill, and the Empire Industrial League Committee have [illegible] at work who will submit data to certain English capitalists in reference to the possibilities of that district for such an industry. Under the adjustment of Hydro-Electric rates, Georgetown has also been granted a reduction of twenty per cent which is good news to the paper mills using electric power in that town.

CANADIAN MARKETS

The market situation during December is generally a theme of not much interest as trade in all lines of paper making is rather quiet with the exception of news print. All these mills continue busy and contracts are now being renewed at an advance, in a number of cases, of five and ten cents per hundred over last year's quotations. The prevailing figure in several important contracts is $2.10 to $2.20, sidewalk delivery. There are a number of contracts yet to be renewed, and prices in no case will be lower than last year. Book and writing mills are rather quiet and a number have closed down for a few days in order to give their employees a holiday, while stocktaking will form a part of the preceedings in the mills and paper houses during the next few weeks.

Owing to the easier tone of the sulphite market and the drop in prices it is not expected that any raise in book, bond, ledger or writing papers will take place. Ground wood is rather quiet so far as placing any orders outside of contracts are concerned, and some concerns, which have been buying supplies owing to low water, are again making their own product. Wrapping papers of all kinds are quiet and it is expected that no change will take place until well on in January. There has been a sluggish demand for boards of all grades and roofing papers are dull, consequently the market for folded news and other lines is quiet. The paper and pulp situation is expected to remain unchanged for some time now, and most plants are attending to immediate orders and will devote their attention to inventories, and closing accounts for the year.

Jobbers report a fair business for the holiday period, but, in many cases, the volume is not up to last year. The rag and paper stock market presents no new features and mills are at present inclined to let stock run low, while any buying is done on a conservative basis.

All branches of the trade, however, are looking eagerly forward to the birth of the new year, and do not anticipate that the war will have any depressing effect on the industry and that business, while it may not be as good as last winter, will have a firm tone and conditions will be more normal than they have been for some months.

Quotations, f.o.b. Toronto, are:—

Paper.

News (rolls), $1.95 to $2.05 at mill, in carload lots.
News (sheets), $2.10 to $2.15 at mill, in carload lots.
News (sheet), $2.20 up, depending on quantity.
Book papers (carload), No. 3, 3.75c. to 4.25c.
Book papers (ton lots), No. 3, 4c. to 5.50c.
Book papers (carload), No. 2, 4.25c.
Book papers (ton lots), No. 2, 4.50c. to 5.25c.
Book papers (carload) No. 1, $4.75 to $5.25.
Book papers (ton lots), No. 1, 5.25c. to 6.00c.
Writings, 4½c up.
Sulphite bond, 6½c. to 7½c.
Grey Browns, $2.35 to $2.75.
Fibre, $3.35 to $4.00
Manila, B., $2.85 to $3.25.
Manila, No. 2, $3.10 to $3.50.
Manila, No. 1, $3.35 to $4.00.
Unglazed Kraft, $3.90 to $4.50.
Glazed Kraft, $4.75.

Pulp.

Ground wood pulp (at mill), $16.00 to $18.00.
Ground wood, $22 to $24, delivered.
Sulphite (unbleached), $44 to $45, del. in Canada.
Sulphite (unbleached), $45 to $46, delivered in U.S.
Sulphite (bleached) $57 to $58.
Sulphite (bleached), $58, delivered in U.S.

Paper Stock.

No. 1 hard shavings, $2.00 to $2.05, Toronto.
No. 1 soft white shavings, $1.85.
No. 1 mixed shavings, 55c.
White blanks, $1.00.
Heavy ledger stock, $1.50.
Ordinary ledger stock, $1.15.
No. 2 book stock, 50c.
No. 1 book stock, 90c.
No. 1 Manila envelope cuttings, $1.20.
No. 1 print Manilas, 60c.
Folded news, 32½c.
Over issues, 40c.
No. 1 cleaned mixed paper 30c.
Old white cotton, $2.50 to $2.75.
No. 1 white shirt cuttings, $5.75 to $6.00.
Black overall cuttings, $1.70.
Thirds, blues, $1.50.
Black linings, $1.75.
New light flannelettes, $5.00.
Ordinary satinets, $1.00.
Flock, $1.10.
Tailor rags, 90c.
Manila rope, 2¾c to 3c.
No. 1 burlap bagging, 95c.

Quotations f.o.b. Montreal are:—

Book—News—Writing and Posters.

Roll News, $40 to $43 per ton for large orders; $45 to $50 per ton for small orders.
Ream News, $45 to $47 per ton for large orders; $50 to $60 per ton for small orders.
No. 1 Book, 5¼c to 6c per lb.
No. 2 Book, S.C., $4.50 to $4.75 in large quantities; $4.75 to $5.50 in small quantities.
No. 3 Book, M.F., $4.00 to $4.25 in large quantities; $4.40 to $4.50 in small quantities.
Writings, 5c to 7½c.
Sulphite Bond, 6½c to 8½c.
Writing Manila 5c.
Colored Posters 4c. to 5c. per lb.
Cover Paper 5½c. to 7c.

Wrappings.

Grey Brown, per 100 lbs., car lots, $2.25 net; 5 tons $2.45; 2 tons, $2.55; 1 ton, $2.65; less, $2.75.
Red Brown, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, 3.15; less, $3.25.
B. Manila, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, $3.15; less, $3.25.
No. 2 Manila, car lots, $3.10; 5 tons, $3.20; 2 tons $3.30; 1 ton, $3.40; less, $3.50.
No. 1 Manila, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton, $3.65; less $3.75.
Kraft, $3.75 to $5.00.
Fibre, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton $3.65; less $3.75.
Fibre, $2.75 to $3.50.
Manila, B., $2.50 to $3.25.

On large orders to the jobbing trade some manufacturers are quoting 10 per cent off the above prices on wrapping.

Pulp.

Sulphite easy bleaching, $43 to $45 per ton.
News quality, $41 to $42 per ton.
Bleached sulphite, $54 to $59 per ton.
Kraft pulp, $3.60 to $4.00.
Ground wood, No. 2, $22 to $24, delivered United States.
Ground wood, No. 1, $15 to $16.

NEW YORK MARKETS

(Special to Pulp and Paper Magazine.)

New York, N.Y., Dec. 24, 1914.

There has been no appreciable change in the mechanically ground wood pulp situation since the last report in the column of this paper. Mills have been inclined to ignore the offers of small supplies of ground wood for delivery over the next few months. It is reported in the local market that certain foreign mills have been soliciting offers from the paper manufacturers of this country for supplies. As far as could be learned there have been no deals closed in foreign ground wood. No price was named with the offers, and it is believed that the pulp makers of the foreign countries are awaiting replies from domestic paper makers. One grinder said that he thought the coming year would show an upward tendency in the value of ground wood pulp.

Imports of foreign chemical fibres have been rather light since the last report. While the manifests of the recently arrived ships show that there has been a fairly large quantity of pulp coming into the various ports of this country, it is a fact that most of the arrivals were imported to cover the supplies of paper mills on contract during the period of closed navigation, which is practically at hand. One importer said that he has on dock now a small quantity of all grades of sulphite which is available on spot at the following prices, ex dock: Bleached sulphite 2.60 to 2.75 according to grade. Strong unbleached, 1.90 to 2.05. Easy Bleaching, 2.10 to 2.15. Kraft, 1.95 to 2.05. The same prices are given for contract delivery over 1915,and possibly for a longer period.

The rag market has been utterly featureless. The demand for all grades of both foreign and domestic packings of rags has been practicaly nil. A few small orders at extremely low values were closed by some dealers. It is the general opinion among the dealers that many mills could, by careful buying, pick up a large supply of all kinds of rags at remarkably low prices. The market for old bagging and rope is also quiet and weak The current value of old manila rope is about 2.75c. a pound, for both domestic and foreign collections.

Never before has the market for old waste papers been so dull as at the present time, according to a number of dealers and packers, who have been in the hardware business for the last quarter century. There is at all times, a little movement of the stock from the packing houses, as the fire laws will not permit any accumulation. The most notable feature of the market is the condition of mixed papers, for which the present price is 20 cents a hundred. It is said that there is no profit in shipping this grade for less than forty cents a cwt. As the board business has been so quiet, the mills have had no need for stock, and the only reason they will take it at all, is because they can buy it at their own price. Contracts for shavings and other grades of waste paper have been renewed in some cases at the same price as last year, but others are still pending because the binderies are holding out for prices that the packers cannot afford to pay.

Ground Wood, No. 1, $20 to $25.50, delivered.
Ground Wood, No. 2, $17.50 to $20, delivered.
Unbleached Sulphite, dom., 2⅛ to 2½, delivered.
Unbleached Sulphite, imptd., 1.90c. to 2.10c, ex dock, New York.
Bleached Sulphite, domestic, 3.35c, delivered.
Bleached sulphite, impt., 2.80c. to 2.90c, ex dock, New York.
Easy Bleaching, impt., 2.10c. to 2.20c, ex dock, N.Y.
Unbleached sulphate, impt., 2.00c to 2.15c ex dock, N.Y.
Bleached sulphate, impt., 2.80c to 3.00c, ex dock, N.Y.
Kraft Pulp, 1.95c to 2.15c, ex dock, New York.

There have been a number of important changes in the general situation in this country since the first of December. The most optimistic thing that took place was the granting of the 5 per cent. increase in freight to the railroads in the Middle Western and Western States by the order of the Inter-State Commerce Commission. It is calculated that this advance will allow the railroads to make enough money to put them on their feet. It will also mean the purchase of new equipment, and thus give employment to thousands of people now out of work because of the depressed condition of the steel industry. The news of the increase was received by the trade as the real return of prosperity.All business in paper has reflected a rather quiet tone, as this is the season for taking inventory by both mills and jobbers. The demand for newsprint has been a little above normal, and shipments have shown a fairly large tonnage. Short news and side runs have been in normal inquiry at prevailing figures. Reports from book mills show that business has been fair, and that prices are firm. It was reported that some of the wrapping mills were offering some grades at prices slightly below the level that was attained shortly after the outbreak of the war. It was said that a certain dealer had closed a contract for a large supply of good kraft paper for delivery over 1915 at a very low price. Just what was paid was not made known, but the figure was in the neighborhood of three cents a pound. Writing paper mills have been running on part time only, as the demand for their goods has been very poor. There were no changes in prices as far as could be learned. Paper bags were in poor demand and prices were weak. It is generally believed that the new year would bring firm prices, and a fair demand. As board mills cannot run without orders, most of them have been shut down on account of poor business. The price of chip board showed a small advance over the quotation of a few weeks ago. The current value is $25 a ton, against 23 about a month ago. The tissue situation is essentially without change. There has ben a fair demand for No. 1 white, at 45 cents a ream. Manila and No. 2 white has been a little weaker, and is in rather poor inquiry. Specialties have been in poor demand, and without feature.

Paper.

Quotations unchanged for all grades of paper:—

News, rolls, transient business, $1.95 to $2.05 f.o.b
News, rolls, contract renewals, $2.05, f.o.b.
News, side runs, 2.25, f.o.b. New York.
News, sheets, 2.30, f.o.b. New York.
News, sheets, 2.35, f.o.b. New York.
Book papers, car lots, M.F.S., $3.75 to $3.90 f.o.b.
Writing paper, superfine, 13¾c to 17c, del. east of Miss. River.
Writing paper, extra fine, 11c del. east Miss R.
Writing paper, No. 1, fine, 9c, del. east Miss. River.
Writing paper, No. 2, fine, 8c del. east Miss. River.
Writing paper, engine sized, 4½c to 8c, east Miss. R.
Bond paper, 5c to 24c, delivered east of Miss. R.
Ledger paper, 8c to 30c, delivered east of Miss. River.
Linen paper, 7c to 18c, delivered east of Miss. River.
Manila jute, 5¼c to 5½c, delivered.
Manila, wood, 2.65c to 3.25c, delivered.
Kraft, No. 1, $3.65 to $4.00 f.o.b. New York.
Kraft, No. 2, $3.35 to $3.60 f.o.b. New York.
Boxboards, news, $27 per ton, delivered.
Wood pulp board, $40 per ton, delivered.
Boxboards, straw, $23 per ton, delivered.
Boxboard, chip, $25 per ton, delivered.
Tissue, fourdrinier, 50c f.o.b. New York.
Tissue, white, cylinder, 45c to 47½c f.o.b. New York.

THE BRITISH MARKETS.

A Review of Trade in 1914.

(From Our London Representative.)

British paper and board manufacturers have during the year just closed been faced with considerable difficulties in the matter of raw materials. They have had to contend with higher prices, which naturally means an increase in the cost of production, and in cases where higher values could not be demanded from the consumer of paper and boards, attention had to be directed to economy in the mills so as to recoup what was lost and could not be obtained in other directions. It cannot be said that the British paper mills had a bad year, though we are at war, neither can it be said that the year was good. To strike a happy medium, it is safe to say that the past twelve months were fair, and the dividends and reports of the various companies back up my conclusion—that is, if they are to be taken as a criterion of what has been accomplished. On the other hand sellers of raw materials have done well, pulp men in particular, and what stands to them is the policy of catering for contracts covering several years ahead.

Sulphite and Sulphate.

Generally, dealings in sulphite and sulphate were during 1914 on a large scale and prices were most favorable for sellers. The market, however, had many ups and downs, and it has had many peculiarities, which are difficult to include in a short retrospective summary. In addition there are many opinions prevailing; but the whole position has been nicely summed up by a pulp man I had a conversation with the other day, when he said, "The year is difficult to gauge"—dull paper trade, rock bottom and high prices, war, scarcity in shipping and high insurance, in addition to war risks, contraband cargoes, rushing shipments and buying at war prices were some of the features and elements the pulp man had to contend with in the old year. From January to June, the dullness in the paper trade left business in pulps uncertain. The year opened with bleached sulphite at $52.80 to $56; easy bleaching, $42 to $43; strong sulphite $37.50 to $39.60; sulphate (unbleached) No. 1 $39 to $39.60; and kraft pulp $38.40 to $39.40. A month later these prices were on a lower level and only small prompt parcels were dealt with. In March business fluctuated and the market showed better signs. Fair prices were found for soda pulps—easy bleaching, particularly—and a good deal of sulphite changed hands at firm prices. In June inquiries were being made for forward deliveries and sulphite quotations showed a reduction, but not sufficiently reduced to encourage much buying. In July trade had a dullness, but stocks in the mills were sufficient to keep things going for sometime and shipments under current contracts were of a decent size. At the beginning of August the unexpected crash came—Germany declared war, then Great Britain was dragged in and shipping was upset. Pulp men and paper men did not know which way to turn from the 4th August to the 8th. Bleached sulphite was quoted $72 to $85.50; easy bleaching sulphite, $25 to $26; strong sulphite $23 to $24 and soda or sulphate pulps were not to be had. The British Admiralty relieved the situation by allowing shipping to be resumed with Scandinavia. But meantime Canada and America were fallen back upon for paper and pulp supplies. America responded slowly, but Canada has done well and there is a disposition to-day to have further dealings with the Dominion if supplies were only obtainable. In September and October there was a great rush for shipments of all kinds of pulp under current contracts and some large dealings were effected in prompt parcels, cash being paid down against documents. Of course, German and Austrian supplies of pulp were cut off, and Belgium and France, and Japan were knocked out of the field as consumers, so that the supplies for these countries were directed to the British and American markets. In November shipments arrived on a smaller scale and business during the month, and also in December, fell off, stocks being plentiful. The year ended with prices as follows: Bleached sulphite $64.80 to $72; easy bleaching sulphite $48 to $50; strong sulphite $43.20 to $45; sulphate (unbleached) strong, $40.80 to $49; kraft pulp $39 to $40. All quotations are c.i.f. British ports.

Ground Wood.

The market for ground wood in 1914 had a varied experience—prices nearing the record for high levels and for cheapness. At the beginning of the year quotations were nominally as follows, c.i.f. British ports:—Ground Wood (50 per cent, moist) $10.20 to $10.80; Ground Wood (dry) $20.40 to $21.60. Forward deliveries were about $1 extra. Up to the middle of February very little spot business was transacted, but but toward the end of the month prices fell and the market took a turn with a firmer tendency and a few contracts were entered into. In June not much new business was doing. In July a good many spot parcels changed hands at low rates, but paper mill owners gave more attention to contracts for 1915-16. One or two sellers, it was rumored, had contracts at prices which were considered below cost—or, at least, scarcely able to cover cost. As a matter of fact Ground Wood moist (50 per cent), could be bought in London at this period for $9.40 per ton c.i.f. British ports. This was the state of things in July and there was plenty of pulp to be had. Then war broke out at the beginning of August and there was a rush for future supplies. Ground Wood jumped to $14.50 and $15.50 a ton and shipments could not be made. During September heavy supplies under contracts were sent to London and other ports and some parcels for prompt delivery were changing hands, cash being paid against all documents. Canadians were also asked to supply the market and some good shipments arrived from Chicoutimi and other places. Newfoundland had a good share of what was going. There was also fair buying in October, and prices got on a lower level. In November and December business fell off, as stocks were heavy, and the year's closing prices were: Ground Wood, moist $9.60 to $10; Ground Wood, dry, $24 to $25. No quotations since war broke out have been given for forward deliveries. In cases where negotiations did take place business always fell through owing to the prices demanded. Of course, Ground Wood sellers had the same difficulties as sulphite sellers in regard to shipping and insurance, etc. Many cargoes of ground pulp have been held up in timber boats as contraband by German men-of-war. Canadian pulp holds a high position in the estimation of English buyers, but the great difficulty is the price, they say. Scandinavia throughout the year suffered greatly by shortage of water.

The Paper Industry.

When the official figures are issued in the middle of January it will be seen that the export trade of the British paper industry, as well as the imports from all countries, shows a considerable decrease. The imports have been reduced by the cutting off of German, Austrian and Belgian supplies, owing to the war. The export trade has been disturbed by the difficulties appertaining to shipping, besides the war, and a reduced demand in most of the foreign and colonial markets. Reduced imports, of course, means a greater consumption of home-made paper and it must be admitted that the mills during the past year have had a better domestic supply to keep up, which, in many cases recoups them for what is lost on export account. Esparto paper producers have had a difficult year to deal with and many at the close of the twelve months are on reduced output. Newsprint manufacturers have done very well on the whole, and have very little to complain about. This may be said of all "white printings" as the trade call them. Kraft is at present in good demand, the German supplies being cut off, but earlier in the year the amount of business passing was not up to expectations. In colored papers Germany was a big supplier, and the shortage of dyestuffs has now hampered the British producers, so that the demand exceeds the supply. Wall paper manufacturers have also suffered during the year. Owing to the high cost of production many of the mills put on from 2½ to 6 per cent increase in their prices, and the year 1915 is being looked forward to with great interest, as it is felt that dullness in the demand for paper cannot go on much longer—a demand must arise sooner or later. A great feature of the British mills is the up-to-date methods introduced. Economy is the motto everywhere and electricity is playing a big role in the output, both in power and lighting. It is also felt that the German trade being now chopped up, there is every chance for British mills in capturing a good share. Generally, the opinions in London are that Canadian pulp and paper mills have a golden opportunity and no time should be lost in making the industries of the Dominion take their proper place in the markets of the world.

In the chemical markets there is very little difference at the end of the year when comparing prices at the beginning of the year. Rosin is dearer and china clay is cheaper, particularly for contracts.

ECHOES FROM NEWFOUNDLAND.

(Special to Pulp and Paper Magazine)

The logging season has begun now in earnest in Newfoundland. The season which threatened to be one of inactivity has been transformed into the busiest and most important in the history of the country. Several representatives of English collieries have been here seeking pit props. At first it was impossible for any business transactions to be done, owing to an enactment of the legislature respecting the Crown Lands of the colony; it was as follows:—"No holder of a timber or pulp license shall take or carry away for exportation from land licensed any trees, logs, or timber, unless and until the same have been manufactured either into pulp or paper pulp, sawn timber or other saleable products of timber lands under a penalty of not less than twenty dollars for each tree cut."

The legislature was convened, and an Act passed suspending the aforesaid law till June, 1915. This industry, of which the people were hitherto entirely ignorant is, consequently, this season being carried on in enormous proportions. Several contracts of from twenty-five to one hundred thousand cords have been secured and thousands of loggers are already in camp.

The report of the Anglo Newfoundland Development Company, which has just been published, shows that a dividend to shareholders of 15 per cent has been declared.

The Harmsworth people, whose paper mills are located at Grand Falls, have witnessed this season the greatest output of paper from their mills since they established themselves here.

Some newspaper criticism was aroused lately over the granting of an area of land known as the Trin-Bon land. Controversy over alleged scandals in connection with this land has been the feature of many recent governmental elections. The grant in question has an area of approximately one hundred and twenty square miles. For years it has been coveted by timber men. Although the area is comparatively small, it is perhaps the best wooded and watered area in Newfoundland.

According to the statistics of the American Paper and Pulp Association figures covering the production of approximately 80 per cent. of the newsprint mills in this country show that the output of newsprint paper during the month of October was larger than the output in September by over 4,000 tons. The actual production during the twenty-five working days of October was 96,810 tons, while the normal October output is 104,317 tons, showing that the actual was 93 per cent of the normal. Production in September amounted to 92,347 tons. Illustrating the increasing demand for newsprint paper are the figures showing the shipments during October, when 99,716 tons of completed paper were shipped, leaving stocks on hand on the first of November, aggregating 42,524 tons. Shipments the month previous were 95,522 tons, while stocks on hand at the beginning of October amounted to 45,068 tons.

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Statistics Successful

The Executive of the Canadian Pulp and Paper Association reports wonderful success in the collection of statistics of production and distribution of news, groundwood and sulphite in the month of November. Forms were sent out by the Secretary of the Association at the end of that month and during December the firms interested sent in their figures. On the first of January the aggregates were made up and mailed to those contributing. President Riordon says, concerning the work:

"The statistics received show that the Association has the support of the great part of the industry. In news, figures were received from firms whose normal capacity constitutes 88.6 per cent of the estimated total normal capacity in Canada, outside of British Columbia. In sulphite there was an 84.2 per cent report and in groundwood, 73.2 per cent. Work is now proceeding on the development of other sections, and already statistical blanks have been sent out to one other section. It is expected that blanks for still another will be made immediately, and there will be three sections reporting to the Association.

The one point which now has to be covered is the early return of the blanks by members. This is essential to the proper compilation of statistics and to make them of the greatest value to all who contribute.

A Little Story

On a farm situated in a rich and easily tilled valley in the centre of a community of prosperous people lived a young farmer and his small family. The farm on which they lived was a good one, endowed with very rich soil, a fine wood-lot, good water and a wonderful waterfall in one place, where the stream that coursed through the tract fell over a limestone ridge. The farm had been given to the young husbandman by his father, John, who lived some distance down the road, and at one time had been divided from the other farm in the valley, owned by an older son, Sam. Jack, the younger son, had done pretty well on his farm, considering that he had been under the necessity of "breaking" a large proportion of it, and he was able to trade off a large quantity of wheat, dairy produce and some meat to Father John for some of the woollens from the mill he possessed, and various other comforts. The wood-lot on Jack's farm was of considerable value in the eyes of Father John and other dwellers in the vicinity. A very distant relative, Fritz, and his large family took a goodly quantity of Jack's products, as did also Oley, Jean, and others. Jack's younger brothers, who had farms at various points farther away were on particularly good terms with him, and there was much intercourse between the various families.

Big Brother Sam had a beautiful farm. He had worked hard for many years, and had taught his sons carefully how to make the most of everything they touched. Fritz had, in some respects, a still more wonderful knack of making use of his opportunities. He worked early and late, and had done so from the time his father Bismark, and his old uncle Stein had passed away, leaving the farm to his care. The industry of his family was wonderful. They worked out their own methods for themselves, made their own tools, and made them well. The same applied to Father John to a very great extent, but he had chosen to be financier and banker for the community, and made so much money by his investments and mortgages that he had become of late a little inclined to pay less attention to working of his farm than to financial affairs. He had given Jack plenty of assistance in getting started and was rather proud of the way in which his son was progressing.

However, Jack could see that there was one thing radically wrong with his children. They were all constantly going over to Father John's farm and begging for a copper. They were forever turning up their noses at the rather rough clothes which John had to provide for them, and wanted to be dressed in the latest style, as were Jean's family, or as some of their cousins on Father John's farm, or even as Brother Sam's children. These latter young ones they always admired and aped. If Sam's children whistled a tune, they caught up the air and kept on whistling it until Sam's children found another. They always borrowed books from Sam's library, and even occasionally used to happen around Sam's at meal time, just to see what new thing they had for dinner. And so it went on with Jack's children: they didn't seem content, somehow, with what they had themselves, and they certainly made no very serious efforts to amuse themselves.

Then one day Father John and Farmer Fritz had a falling out. Their farms adjoined, and there had been difficulty for some time about the line fence and just to what extent Fritz should allow his stock to run on Jean's farm and over the truck garden of Albert, an industrious fellow who lived between Jean and Fritz. While John was occupied in this unfortunate dispute with Fritz, and the farms of both were being neglected, Jack began to wake up to the dependence he had shown upon his neighbors. He saw his own attitude reflected in his children. He saw how he himself had fancied Sam's equipment as against his own, and had not been careful to square all his debts with his relatives and neighbors. So he called his children together and said: "Now boys and girls, I want you to show a little more independence of spirit than you have heretofore. I know that there are many things that we can't raise on this farm, and I don't propose that we should try. But our farm is good for a whole lot of things that we haven't thought of raising yet, and if we will only put our heads and hands and hearts into our work, instead of putting our fingers in our purses, and stop cutting down a part of our wood-lot every time we want a new silk shirt, we would get along a great deal better. I know your gran'dad has helped me enough, and I am going to show a greater return for his money in the future. Now we'll just stop selling off our produce long before it is planted, settle down to business, and get a little more backbone, a little more money, and a little more confidence in ourselves. Now I want you all to help me."

All his neighbors heard of what Jack said, and they are looking on with more interest than Jack's children realize, to see what they will do.

Let us bring some new elements into the story. Jack's children are setting about to write their letters on paper which they have made themselves, and next Christmas they will give as presents, boxes of notepaper that they have made in their own mills. They will pack their shoes and candy and other things in their own cardboard, and they will sheath their houses with a great deal more Canadian board. They will use more of their own tissues and waxed papers, and print their books and magazines upon their own book and coated papers. They will use their own newsprint, of course, and further, they will begin to make new kinds of paper that have heretofore been brought in from the neighbors. They may not throw away all the paper they have bought and have on hand, for that would be sheer waste, but next time they order—we'll see!—they will buy Canadian papers.

Safety Associations

Under the new Ontario Workmen's Compensation Act pulp and paper mills are included in Schedule I., which comprises those firms liable to contribute to the "Accident Fund." The Accident Fund is the one large indivisible source from which are drawn the payments of the claims in all classes. Of course, an account is kept of all the different classes of risk, and payments are charged against the various groups. All pulp and paper mills in the Province are assessed 1.4 per cent annually on their payrolls, and all mills join together, through the Accident Fund, to pay the compensation to employees for their injuries.

The Act provides one very sane safeguard against the carelessness of individuals within the class. It allows for the establishment of Safety Associations, which are for the purpose of teaching employees how to be careful, co-ôperating on the services of inspectors and doing everything else that will serve to remove the risk. If the Commission appointed to supervise workmen's compensation deems wise they may pay from the funds at their disposal the expenses of inspectors in any of the classes.

It will be seen at once that the method the Commission has adopted is worthy of the highest praise. and most enthusiastic support. Accidents can best be cut down by the thought, care and co-operation of those actually at work in the industry.

The onus, which is thrown upon the employer and employee alike, will serve only to make manufacturing more profitable and more pleasant to all engaged.

The Canadian Pulp and Paper Association has issued a circular to all mills in the Dominion inviting them to convene at the time of the proposed annual meeting in February, for the purpose of laying down the basis for safety associations.

As it is expected that other provinces will follow the lead of Ontario and adopt legislation on workmen's compensation very similar to that which went through the Toronto legislative halls, much can be done in such a gathering. It is understood that experts will be invited to give their opinions as to the best methods of attaining ample organization.

The lumbermen of Ontario and Quebec have already responded, and there should be visible in woods operations and milling, a distinct falling off in the number of accidents.

The formation of a safety association among pulp and paper mills would be a move which should bring incalculable benefits to all concerned.

Technical Section

The Executive of the Canadian Pulp and Paper Association has decided upon a move which will be of the highest interest and the greatest value to all members of the Canadian industry. It is, that at the time of the Annual Meeting, which, it is expected, will be held in the month of February, there shall be established within the Association a Technical Section for the consideration of all problems arising in the manufacture of paper. To this section mill managers, foremen, superintendents, engineers, chemists and others who have the actual operation of mills at heart, will belong, and co-operation in the exchanging of views by papers and discussion will be carried out. The President of the Association has nominated Dr. J. S. Bates, Superintendent of the Dominion Forest Products Laboratories, Chairman for the organization of this section. Dr. Bates and the Secretary of the Association are now working on a plan of organization, and it is expected should have some definite plan in shape for the consideration of the members of the industry at the time of the Annual Meeting.

Every effort will be made to secure the co-operation of all those active in paper-making. Such a move has not yet been fully successful on the American continent. There is nothing in Canada or in the United States to correspond to the technical associations which have had such an uplifting influence on the pulp and paper industry of Germany, Sweden, Norway and other continental countries. Dr. Bates expects that at the first meeting there will be a series of papers followed by active discussion. The papers will embrace practically every side of the pulp and paper industry, one paper being chosen from each class of interest. Pulp and paper men will do well to endeavor to attend the meeting if it materializes, as is expected, and to promote the interests of all in the development of Canadian industry.

RE TECHNICAL EDUCATION.

The Pulp and Paper Magazine wishes to give its readers the name of the writer of the excellent communication on the subject of Technical Education which appeared in Jan. 1st issue over "Engineering Manager, Bird & Son." The gentleman is Mr. Arthur Crawford Jewett.

Longleaf Pine Good for Kraft Papers

That longleaf pine treated by the sulphate process and properly handled will give excellent kraft pulps and papers, especially the very strong and very tough, lightweight brown wrapping papers, is the conclusion reached by the Department of Agriculture after a series of tests to determine the wood's possibilities as a source of pulp. This conclusion is of significance at this time, because the war has cut off the German supply to this country. The high specific gravity of the wood and the resultant high yield of pulp per cord, says the Department in a recently issued bulletin, give longleaf pine an advantage possessed by few other commercially important woods suitable for pulp making.

This new use for longleaf pine furnishes a means of utilizing the waste in slabs, edgings and trimmings from Southern mills. Tops and defective logs left in the woods and small logs which at present are converted into lumber with little or no profit would furnish a supply of raw material for pulp making even greater than that derived from the mill waste.

The tests were made at the Forest Service laboratory and were of two kinds: those to determine the effect of varying the cooking conditions in the sulphate process, and semi-commercial tests carried on by both the sulphate and the soda process. The sulphate process was found to be superior to the soda, at least so far as longleaf pine is concerned. In the former process the pulp can be very much undercooked and still produce a fair quality of paper, while a soda pulp must be comparatively well cooked before a good paper can be made from it. The best sulphate kraft pulps were obtained with a total duration of cooking of only 3.5 hours, against 6 hours for the best soda pulp.

Sulphate kraft pulps of fairly good strength and toughness can be obtained from longleaf pine with yields as high as 61 per cent or 2,170 pounds of absolutely dry pulp per 10 solid cubic feet of wood. For the production of high grades of kraft wrappings the yield of pulp could be approximately 51 per cent, or 1,800 pounds of absolutely dry pulp equal to 2,000 pounds air-dry pulp per 10 cubic feet of solid wood. The yield per cord would be somewhat less than the weights given since an ordinary 4 x 4 x 8 foot stacked cord may contain from 75 to 100 cubic feet of solid wood.

CORNWALL MAN KILLED IN MILL.

Chas. Potasso, a machinist, employed at the Toronto Paper Company's mill, met with a terrible death on January 4th. He is supposed to have been engaged in oiling the shafting when his clothing became entangled in the machinery, and he was drawn around the shaft until the clothing was almost stripped from his body, when he fell to the floor. The unfortunate man was alone at the time, and no one saw the accident. Both legs were severed from the body, his right arm broken, and his body terribly mangled.

He was 29 years of age, a native of Italy, and leaves a widow and six children, the eldest of which is only 8 years old.

As the Ontario Workmen's Compensation Act is now in force in the Province the family will be entitled to compensation under its provisions.

THE RELATION BETWEEN THE CONSISTENCY OF STOCK AND WHITE WATER ON PAPER MACHINES

By EDWARD J. TRIMBEY, M.E.

(Written Specially for Pulp and Paper Magazine.)

Nearly every paper mill is equipped with a more or less extensive laboratory, or those which are not so equipped themselves generally have an arrangement with an outside laboratory for the frequent testing of the various supplies purchased. One of the simplest tests which can be made is to determine the consistency of stock or of white water, as all that is needed is a graduate for measuring the amount taken, a filter paper and a funnel, with the chemical balances to weigh the filter paper and the filter paper and stock after drying; the term consistency is used to designate the number of parts of dry material in a given amount of liquid stock or white water, and when one hundred parts of liquid stock or white water are taken as the basis the consistency will express the amount of dry material as per cent. This test is so easy and so simple that it is not often done and yet it can be made the basis of investigations which will result in great economies in the saving of stock and filler, as the question of filtering white water samples has often given the incentive to making simple changes which have resulted in a saving of several per cent of raw material.

How many laboratories connected with paper mills have taken the trouble to determine the relation between the consistency of the tray water and that of the suction-box water from their machines when making their various grades and weights? It is because the relative consistency of the various kinds of white water, as compared with the consistency of the stock supplied to the wire, is not known that there are so many machines around the country which have a far greater loss of stock than is necessary.

As there is more newsprint made than of any other one grade of paper, suppose we consider this matter of relative consistencies with reference to newsprint machines. If a man from the office or from the laboratory goes to the machine room and attempts to tell his friend the machine-tender, that the small stream of white water overflowing from the trays to the sewer contains about two-fifths as much dry stock per gallon as the stock going from the head-box to the wire, he will be laughed at unless he has the forethought to slip two empty bottles of the same size into his pocket before starting out and, while his friend is enjoying his laugh, fills one from the head-box and the other from the overflow from the trays and adding a pinch of alum to each, places them on the window-sill for a few minutes to settle. It will not be necessary to filter and weigh the stock in the two samples to convince the most skeptical of the truth of his first statement.

From tests made on more than forty newsprint machines in over a dozen different mills it has been found that the ratio between the consistency of the tray water and of the supply to the wire is almost never less than 30 per cent, and is seldom as low as this, but is generally from 38 per cent to 42 per cent, and occasionally it will be as great as 50 per cent when the ground wood used is fine and a high percentage of filler is used. These tests were made on machines at all speeds from about 275 feet per minute to 600 feet per minute. The speed has much less effect on this ratio than other factors, for it happened that at about 275 feet per minute the ratio was 35 per cent, while some machines at from 360 to 410 feet per minute gave from 42 per cent to 52 per cent; others at 500 feet per minute gave about 42 per cent, and machines at 600 feet gave but 38 per cent. As there is but little variation in the weight of newsprint, or in the relative amounts of ground wood and sulphite used, the effect of these factors will be eliminated in comparing two machines. In general it will be found that the factors which determine the ratio between the consistency of the tray water and of the supply to the wire on newsprint machines are the character of the ground wood used, the amount of filler furnished, and the efficiency of the white water system of the mill as a whole.

The consistency of the water from the suction-boxes varies more widely than does the tray water. It will generally be from 12 per cent to 16 per cent of the consistency of the supply to the wire, and from 28 per cent to 36 per cent of the consistency of the tray water, though where the ground wood used is very "free" and there is ample wire forming-surface so that the sheet will be well drained before reaching the suction boxes, it will often be found as low as 7.5 per cent to 8 per cent of the consistency of the supply to the wire, and from 21 per cent to 24 per cent of the consistency of the tray water.

The point is often raised that the greater part of the material in this white water, and especially in the suction-box water, is clay: that this is not the case is shown by the figures given in Table 1 which are fairly representative for newsprint machines.

Table I.

	Per cent Consistency.	Per cent Clay.
Supply to wire.	0.61	12
Tray water.	0.24	27
Suction-box water . .	0.08	37

The amount of clay furnished to the beaters was about 3 per cent, but the stock going to the wire showed 12 per cent clay due to the large amount of clay which came from the tray water and the suction-box water and which is continually circulating around. The consistency of the tray water in this case was 39 per cent of that of the supply to the wire, and the suction-box water was about 13 per cent as rich as the supply to the wire and 33 per cent as rich as the tray water.

When the weight of the sheet is varied and the grade of stock used is the same it is interesting to note these ratios vary. Table 2 giving the results of a series of tests on a Hanging Machine, illustrates this change in the ratios.

Table II.

Weight Basis in Ounces.	Supply to Wire.	Per Cent Consistency Tray Water.	Suction box Water.	Ratio "A." P.c.	Ratio "B." P.c.
18	1.39	0.314	0.054	22.5	3.9
	1.31	0.286	0.040	21.8	3.1
15	1.22	0.328	0.056	26.9	4.6
	1.22	0.341	0.059	27.9	4.8
	1.32	0.360	0.068	27.3	5.1
12	1.28	0.444	0.094	34.7	7.4
	1.26	0.474	0.100	37.5	7.9
10	1.14	0.503	0.104	44.1	9.1
	1.12	0.497	0.107	44.3	9.6

"A" represents the ratio between the consistency of the tray water and the consistency of the supply to the wire.

"B" represents the ratio between the consistency of the suction box water and the consistency of the supply to the wire.

From this table it is seen that the ratios between the tray water and the supply to the wire, and between the suction box water and the supply to the wire vary inversely with the weight of the sheet, but it is necessary to plot them as is done in Fig. 1 in order to see how uniformly these ratios decrease as the weight of the sheet is increased.

In the case of papers in which a larger percentage of sulphite, or other long fibre stock, is used than is used in either newsprint or hanging paper, these consistency ratios are much less. Some idea of the relative consistency values on bag and manila papers of various grades may be gained from Table III.

With these grades of paper the weight of the sheet, the amount of sulphite or of other long fibre stock, and the consistency of the stock coming from the headbox to the wire are the factors which have the greatest influence in determining the consistency of the tray water and of the suction water, and consequently the ratio when compared with the consistency of the supply to the wire. Tests No. 2 and 5 are from the same relative furnish, but the weight in one case is 32 pounds per ream and in the other 100 pounds per ream, while the ratio between the tray water and the supply to the wire are 23 per cent and 9.5 per cent respectively. Tests No. 4 and 9 are from machines making the same weight of sheet, No. 4, however, is from a furnish of 50 per cent of sulphite and 50 per cent of ground wood while No. 9 is from a furnish of 75 per cent sulphite and 25 per cent of Mitscherlich; the ratios between tray water and supply to the wire are 15.5 per cent and 8.5 per cent respectively. It should be noted that the consistency of the supply to the wire for Test No. 4 is more than 50 per cent greater than for Test No. 9, this increase in the consistency of the supply lowers the ratio considerably, as with a more concentrated stock coming onto the wire it takes less time to form a filtering matte on the wire which acts to hold back the finer particles. In general it may be said that the heavier the sheet, the greater the proportion of sulphite or other long fibre stock, and the greater the concentration of the stock coming to the wire, the lower will be the consistency of the tray and suction box waters as compared with the consistency of the supply; while the lighter the sheet, the shorter the fibres, and the more dilute the supply to the wire, the greater will be the consistency of the tray and suction box waters as compared with the consistency of the supply, for papers of this grade.

On machines making the higher grades of paper where no ground wood is used, the ratio between the

Table III.

Test No.	Per cent Bone-dry Consistency: Supply to Wire.	Tray Water.	Suction-box Water.	Ratio "A."	Ratio "B."	Weight per Ream.	Speed.	Furnish.
1	0.44	0.122	0.041	28%	9.3%	32	425	50% Sulphite 50% Groundwood
2	0.54	0.125	.....	23	...	32	306	Same as No. 1
3	0.55	0.103	0.025	19	4.5	40	260	60% Sulphite 40% Groundwood
4	0.64	0.098	0.013	15.5	2.0	50	296	Same as No. 1
5	0.79	0.076	0.054	9.5	7.0	100	106	Same as No. 1
6	0.41	0.103	0.042	25	10	37	418	75% Sulphite 25% Groundwood
7	0.33	0.082	0.052	25	15.5	35	300	100% Sulphite
8	0.42	0.064	.....	15	...	40	306	100% Sulphite
9	0.44	0.038	0.022	8.5	5.0	50	244	75% Sulphite 25% Mitscherlich

"A" represents the ratio between the consistency of the tray water and the consistency of the supply to the wire.

"B" represents the ratio between the consistency of the suction box water and the consistency of the supply to the wire.

consistency of the tray water and of the supply to the wire may roughly be stated as from 10 per cent to 2 per cent.

Table No. 4 gives the results of tests on six machines making papers such as are used by the better class of periodicals, etc.

Table IV.

Test No.	Machine. No.	Per Cent Bone-dry Consistency. Supply to Wire.	Tray Water.	Suction-box Water.	Ratio "A."	Ratio "B."	Weight per Ream.	Speed.
1	1	0.83	0.203	0.086	24.5	10.4	41.5	223
2	2	1.35	0.12	0.044	8.9	3.3	82	109
3	3	0.89	0.125	0.037	14	4.1	37.5	170
4	3	0.83	0.125	0.038	15	4.6	37.5	170
5	4	0.99	0.114	0.055	11.5	5.5	64	131
6	4	1.03	0.100	0.054	9.7	5.2	64	131
7	5	1.00	0.225	0.117	22.5	11.7	....	...
8	6	0.96	0.223	0.075	23.3	7.8	....	...

"A"' represents the ratio between the consistency of the tray water and the consistency of the supply to the wire.

"B" represents the ratio between the consistency of the suction-box water and the consistency of the supply to the wire.

In these grades of paper the percentage of filler used is much greater than in the other grades we have been discussing, and on some of the machines listed in Table 4 considerable old printed paper stock was used. The printed papers and books are first treated with a weak caustic to loosen the ink, etc., and are then washed for a number of hours to remove the ink so loosened and finally bleached. In this process a considerable percentage of the total weight furnished to the washer is removed and goes to waste. At first the wash water is very dirty containing the dirt, ink, etc., but it also contains a large amount of clay or other filler as well as the fine short fibres of the soda pulp which was used in the original furnish. As the washing continues the water coming from the washing drums becomes cleaner than at first, but it contains quite an appreciable amount of fine fibres which find their way through the mesh of the wire covering of the washing drums.

The amount of material removed in this way will vary greatly with different grades of old papers, the mesh of the wire covering for the washing drums, etc., but the following figures will give an idea as to the amount of this loss. One test made by the writer on the waste water from a large number of washers gave an average consistency of 0.10 per cent or from 8 per cent to 10 per cent as rich as the supply to the wire of the paper machines at this mill. To be sure this was not all good stock, but contained a large amount of dirt, ink, etc., nevertheless it represents a loss of material purchased and this loss must show up on the cost sheet. When it is considered that the washers were being run from three to five hours, and that the volume of water coming from each washer was roughly from forty to sixty gallons per minute, it is readily seen that the loss of material occurring at this point is no inconsiderable item. At the same time that this test was being made on the mixture from all of the washers, tests were made of the water from an individual washer at the end of three hours and again at the end of four hours. The first showed 0.031 per cent and the second 0.025 per cent of dry material. In each case it was somewhat dark in color, but it was mostly short fine fibres as a large part of the filler originally in the paper had been washed out by this time. It can easily be seen that if the furnish contains much of this old paper stock that there will be less stock passing through the machine wire with the tray water, many of the smaller fibres having been removed in the preliminary washing treatment, leaving the longer fibres which do not pass through the wire so readily. This is one reason why on machine No. 3 Table No. 4 the ratio between the consistencies of the tray water and of the supply to the wire is but 14 per cent to 15 per cent, even though the sheet is but 37.5 pounds per ream. The amount of clay furnished to the beaters on this machine was practically the same as for machine No. 4 yet it was found that the amount of clay in the stock at the Regulating Box was considerably less, and the percentage of clay in the tray water and suction box water was also much lower.

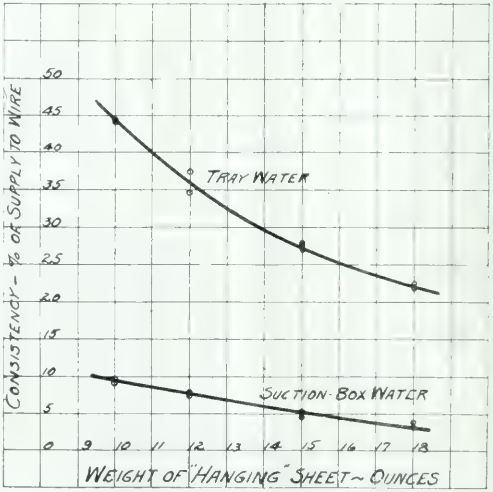


Fig. 1—Showing relative consistency of tray water to the wire, for various weights of sheet hanging and of suction-box water as compared with supply paper.

The relative amounts of filler contained in the stock by filtering the various samples. The percentages of Ash found on igniting portions of the dry stock obtained by filtering the various samples. The per cent of Ash for four of the machines listed in Table 4 are given in Table 5.

Table V.

Per Cent of Ash in Dry Stock.

Machine No.	From Regulating Box. P.c.	From Supply to Wire. P.c.	From Tray Water. P.c.	From Suction Box Water. P.c.
2	12.5	14.0	48.0	64.0
3	8.4	11.0	35.5	55.3
4	11.6	14.1	53.7	68.7
6	....	....	54.6	70.0

The writer has never had an opportunity of making tests of this nature in a mill where a part or all of the furnish was rag stock. If any of the readers who are using rag stock have made similar tests, or will make similar tests, and will publish their results through the columns of the Pulp and Paper Magazine, it will certainly be of interest. The more information which can be obtained having a bearing on the possible losses of stock, or which gives a better idea of the relations existing in different parts of the process, helps to advance not only the individuals and the mills with which they are connected, but if there is a free exchange of such information through the trade journals it will eventually advance the business as a whole with added profit to every one connected with the pulp and paper industry.

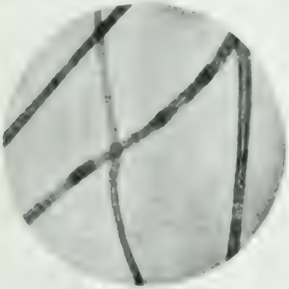
THE TECHNOLOGY OF THE COMMON PAPER-MAKING FIBRES

By HENRY ALDOUS BROMLEY.

The common paper-making vegetable fibres may be divided botanically into the following classes, viz.:—

1. Plant Seed Hairs.—These consist of filaments composed of single individual cells. The only member of this class under consideration is Cotton.

2. Bast Fibres from the inner bark of shrubs and trees. They consist of filaments or fibre bundles made up of aggregated individual cells. Such are Flax (linen), Hemp and Jute.



MANILA HEMP

3. Fibro-vascular bundles of leaves and stems including whole stems. Such are Esparto, Straw, Bamboo, Manila Hemp, and the Woods.

Cotton.

Cotton consists of the seed hairs of several varieties of the botanical genus Gossypium, isolated after the plant has opened, by picking and separating the seeds by ginning. The fibre, which consists of a single long tubular cell, varies in dimensions according to its origin, in length from about 10 to 40 mm., and in diameter from about 12 to 35 microns (.012 to .035 mm.). At first the fibre is cylindrical, but ultimately a flat ribbon with a thickened margin; at the same time it acquires a characteristic twist. This twisting is probably due to changes in the nutrition of the plant under cultivation, since it is not observed in wild cotton. Microscopically, cotton presents, therefore, the appearance of a flat more or less transparent band, with wide central canal and thickened edges, and consequent depression of the middle of the cell. The twisting is often apparent, and when present gives an excellent means of differentiating the fibre from linen, a differentiation which is not otherwise always an easy matter in paper. The cell walls are thin and often present a finely granulated appearance and cross markings which are highly characteristic. Some fibres are always found which have not taken the stain very strongly, and these frequently show markings in a pronounced degree. The cell ends are naturally rounded, but in paper are more usually found frayed and split from the beating.

Chemically, cotton is practically pure cellulose, and its chemical reactions are, therefore, mainly those of cellulose itself. The fibre contains, however, a small percentage of water and earthy matter, as well as traces of fatty, waxy, and albuminoid substances. Treated with Schweitzer's reagent (an ammoniacal solution of copper oxide) cotton undergoes a remarkable change, becoming distended at regular intervals, the intervening portions of the fibre being constricted. It is dissolved by hot concentrated solutions of zinc chloride, cellulose in the hydrated condition being precipitated on dilution of the solution. Concentrated sulphuric acid produces "amyloid" (so called from its chemical resemblance to starch), the fibre being simultaneously disintegrated. Concentrated nitric acid destroys cotton fibre, oxidising it to various products, among which is oxalic acid; but a mixture of nitric and sulphuric acids produces a nitrated cellulose without loss of structure, one such nitrate being gun-cotton. Prolonged action on the part of dilute acids produces hydration (parchmentization) and tendering. Concentrated alkalies act energetically, causing considerable swelling and an increase in transparency and lateral contraction. Dilute alkalies at ordinary temperatures and pressures have little action except to remove non-cellulosic material. Powerful oxidising agents, such as chromic acid, produce oxycellulose and corresponding disintegration. The oxycellulose shows marked differences in chemical character from the parent cellulose, yielding furfural on distillation with

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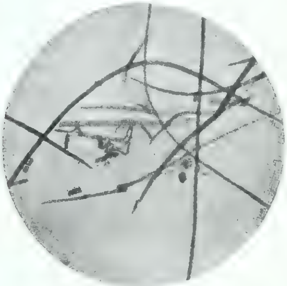
Contribution to the Paper Maker and British Trade Journal.

acids and reducing Fehling's solution. Cotton possesses little or no affinity for basic and acid coal-tar colors, but is readily dyed by substantive colors as Congo red and Benzopurpurin, without the aid of a mordant. The high capillarity of the fibre renders it extremely suitable for the manufacture of blottings.

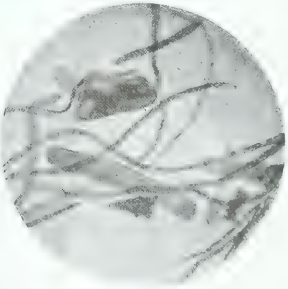

ESPARTO.

Color Reactions.—Iodine followed by treatment with a solution containing 2 volumes of glycerine, 1 volume of water, and 3 volumes of strong sulphuric acid, colors cotton blue (Cross); reduction of the proportion of sulphuric acid producing, however, a brown stain. Iodine and zinc chloride give a reddish coloration, an alcoholic solution of cochineal reddish yellow, and alcoholic magenta red the color of the latter reagent disappearing on addition of ammonia.

The treatment of cotton for paper-making consists merely in a boiling with weak caustic, mainly directed towards the removal of foreign matter in the rags themselves.

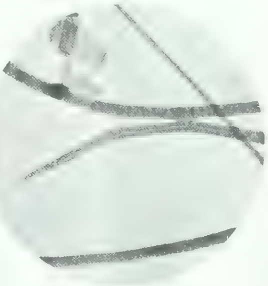
Linen.

Linen consists of the bast fibre of the flax plant (Linum usitatissimum), prepared by first "rippling" with iron combs, to separate the stalk from the seed, and then steeping or "retting," to separate the bast from the woody matter. The fibres vary in length from 25 to 30 mm., and have an average diam. of 20 microns. (.02 mm.). The fibre is a uniform rigid cylinder with thick walls, a narrow central canal, and pointed ends. At regular intervals occur the "nodes," or dislocations, constituting local thickening of the cell wall. Under the microscope these nodes present the appearance of swellings or knots, giving the fibre, in many instances, very much the look of a cane. It is necessary to say that this appearance is largely confined to the raw fibre, beating usually, at any rate, if at all prolonged, largely destroying the characteristics which differentiate the linen fibre from some cotton fibres. The natural ends are seldom or never seen in paper, the beating of linen pulp usually splitting and unravelling them into fibrillae—a fact which partly explains the unusual strength of linen papers. The cell walls are considerably more opaque than those of cotton. Besides the bands visible at the nodes the markings also comprise fine transverse and longitudinal "striae," similar to those of hemp, but not so pronounced. In paper the central canal may be entirely obliterated. and, indeed, in loans the whole appearance of the fibre may be so altered as to be almost unrecognisable. In such cases distinction from cotton or hemp is a practical impossibility. The polygonal shape of the cross section of flax is highly characteristic.


STRAW.

Chemically, linen, like cotton, is nearly pure cellulose. Flax itself is a pecto-cellulose, i.e., cellulose in combination with pectous or fleshy matter associated with the plant; but the treatment to which the fibre is subjected at various stages of its career before becoming paper dissociates most of the non-cellulose constituents. Treated with Schweitzer's reagent, linen swells considerably, but is not entirely dissolved. The other chemical reactions of linen are largely similar to those of cotton.

Color Reactions.—Iodine and sulphuric acid color linen blue, iodine and zinc chloride reddish, and alcoholic cochineal violet. The nodes are well shown with methyl violet.


BAMBOO.

Hemp.

Hemp is the bast fibre of Cannabis sativa separated by "retting." The ultimate fibres vary in length from about 15 to 25 mm., and have an average diameter of 22 microns. (.022 mm.). Microscopically, the fibres show a general resemblance to linen, except that the nodes are not so conspicuous. The cell walls show considerable striation as well as fine transverse lines at intervals, and sometimes attached hairs. The ends are naturally rounded—sometimes branched. The fibre shows a strong tendency to split into fibrillae, and is, on the whole, more opaque than linen. The central canal is rather inconspicuous. It is practically impossible to differentiate microscopically linen and hemp in the beaten condition. In strong packing papers, where the fibre has had less drastic treatment there is more chance of noting the few marks of difference.

Color Reactions.—Iodine and sulphuric acid color the bleached fibre blue, and iodine with zinc chloride reddish. The unbleached fibre may appear more or less strongly yellow. The raw fibre shows slight evidences of reaction to both aniline sulphate and phloroglucinol (see Jute), and is partially dissolved by Schweitzer's reagent.

Bleached hemp produces a soft and lustrous fibre of a good white color, and incomplete treatment with lime furnishes a fibre eminently suitable for strong packing papers.

Jute.

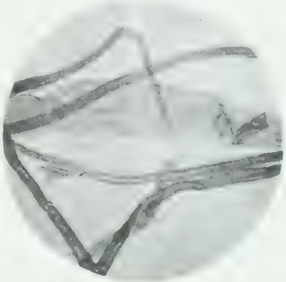
Jute consists of the bast fibre of various species of Corchorus separated by "retting." The average length of the ultimate fibre is 2 mm. and its average diameter 22 microns. Jute is therefore, much the shortest of the textile fibres. Microscopically, jute fibres appear cylindrical and transparent, with smooth walls, often covered with encrusting matter, and a well defined central canal. The fibres are often found in characteristic bundles, and show knots which stand out very clearly in stained specimens. The cell walls are characteristically variable in thickness, the central canal often changing abruptly from a considerable width to a mere line. In other respects the fibres much resemble some of the tracheids from the woods.

Jute is the type of the ligno-celluloses, i.e., celluloses in combination with lignin or woody matter. Iodine colors it, in common with other ligno-celluloses, a more or less deep yellow, as also does a solution of aniline sulphate. A solution of phloroglucinol in hydrochloric acid (50 per cent) applied to the fibre develops a brilliant red. The raw fibre exhibits great affinity for basic coal tar colors, a phenomenon of much importance in textile dyeing. Exposed to the action of moist chlorine gas a remarkable change occurs in jute. The chlorine combines directly with the fibre to produce a bright yellow compound, which, on subsequent exposure of the fibre to the action of a boiling solution of sodium sulphite, is removed with the simultaneous production of a bright red color. This chlorination effect becomes of importance in the consideration of jute bleaching. The fibrous matter remaining unacted upon after treatment with sulphite is practically pure cellulose. Schweitzer's reagent acts upon jute with the production of considerable swelling, while a dilute solution of chromic acid with hydrochloric acid colors the fibre blue. The ash of the fibre contains silica, lime, and phosphates, with traces of manganese.

MECHANICAL WOOD PULP

Esparto.

The bast fibre of esparto is derived from the [illegible] families of Stipa tenacissima, growing on poor soil in Spain and North Africa. The leaf of the plant is that used for paper-making, being dried in the sun, picked over to remove root ends, and pressed up into bales for transport. The average length of the ultimate fibre is 1.5 mm., and its average diameter 10 microns (.012 mm.). Microscopically, esparto presents the appearance of a short, smoothly polished, thick-walled cylinder with finely pointed ends, which occasionally exhibit bifurcation. The central canal is vary narrow and only visible as a fine line. Under high magnification the fibre shows transverse markings at intervals. The whole leaf being used for paper-making, its cuticle contributes to the miscellaneous debris found in connection with the bast cells proper. This comprises, firstly, the serrated or tooth cells, which are found present in all shapes and sizes, and occasionally joined together in colonies; and secondly, the very characteristic seed hairs. These latter resemble nothing so much as raisin stones, and when found may be taken as conclusive evidence of the presence of esparto.


TRACHEID FIBRES FROM PINE WOOD.

The cellulose of esparto, unlike that of cotton, is not present as such, but in an oxidized condition, and is known as oxy-cellulose. This oxy-cellulose gives a red color on boiling with a solution of aniline sulphate, and the reaction therefore forms a qualitative test for the presence of esparto and straw in paper. On distillation with hydrochloric acid of 1.06 specific gravity, esparto yields furfuraldehyde, a reaction which has been made the basis of a method of quantitative estimation of the fibre. When esparto cellulose is treated with a solution of magenta which has been previously decolorized by sulphurous acid (Schiff's reagent), the red color of the dye is restored, the reaction depending on the presence of aldehyde. Prolonged exposure to a warm dry atmosphere causes further oxidation of the unstable esparto cellulose, accompanied by discoloration. This discoloration is often seen in libraries on the edges of books printed on esparto paper. With iodine and zinc chloride esparto is stained a bluish green, some fibres assuming slight [illegible] and being [illegible]. The transverse markings under high [illegible] are seen of a brownish color.

POPLAR WOOD SHOWING VESSEL.

After careful picking and dusting, esparto is cooked with from 6 to 11 per cent of caustic soda in vomiting boilers under pressure. The caustic removes, besides a considerable amount of silica from the cuticle, much waxy and pectous matter.

By reason of their large proportion of air space, esparto papers are both light and bulky. They give a close sheet with a useful printing surface capable of taking a good finish, and are unrivalled for imitation arts and as body papers for coating purposes.

Straw.

Straw consists of the stems of various kinds of grain. The average length of the ultimate fibre is about 1.5 mm., and its average diameter 15 microns. The fibres are short, though usually longer than esparto, not so highly polished as the latter, and show decided knots and joints which stand up well in specimens stained with iodine. The fibres frequently exhibit "kinking" to a marked degree. The central canal is much more evident than that of esparto and the whole fibre rather transparent. At the knots the cell walls are much thickened and the central canal becomes attenuated, broadening out on each side of the joint. The ends are pointed, but more rounded than those of esparto. Individual fibres show great variations in dimensions. Serrated epidermic cells are numerous and are said to indicate by certain differences in appearance the origin of the particular straw from which they are derived. Large numbers of oval parenchyma cells stained blue violet with iodine, are present, derived from the pithy matter of the interior of the stem. These cells are frequently found in pairs joined together by their narrow ends, and these usually show well defined pores and markings. Other cells are occasionally to be seen, including thin tube-like vessels with well-marked pores

The cellulose of straw like that of esparto, is present in the "oxy" condition, but straw is considerably more lignified than esparto. Its cellulose gives a red coloration with aniline sulphate, though not to such a marked extent as esparto and yields furfural on acid distillation. From the point of view of the paper-maker the most interesting characteristic of straw is the remarkable extent to which hydration of its cellulose can be carried, the beating producing a maximum of transparency in the finished paper. The raw material requires a somewhat drastic treatment, both on account of the high proportion of silicious matter present and of the lignified nature of the fibre. The yield of pulp is not usually over 40 per cent. Next to rags, straw is the most easily bleached material used for paper-making, requiring, according to Griffin and Little, not more than 7 to 10 per cent of its weight of bleaching powder.

Bamboo.

Bamboo pulp is derived from the whole stems of various species of Bambusa. Both physically and chemically bamboo shows great similarity to straw. The average length of the fibre is about 4 mm. and its average diameter 15 microns (.05 mm,). Microscopically, the ultimate fibres show a general resemblance to those of straw, but are more rigid in appearance, and considerably more opaque. The central canal is not very evident. The cell walls, which are thick, exhibit at intervals cross markings in the form of an X. The fibre appears to break easily at the joints, specimens often showing a half divided appearance at these points in beaten pulp. One characteristic is the very large proportion of the pith cells, which occur much more frequently than in straw.

For paper-making, bamboo requires a somewhat drastic treatment with caustic, and a rather high proportion of bleach It makes a strong somewhat harsh paper with a peculiar cloudy look-through, and capable of taking a high degree of finish. The writer has seen blottings made from this material, which showed a very high degree of absorptive power. The fibre produces from 42 to 45 per cent of air-dry pulp (Sindall).

Manila Hemp.

Manila hemp is derived from the leaf stalks of Musa toxtilis, a variety of plantain growing in the Philippines. After stripping the plant is scraped to expose the bast fibres. The average length of the ultimate fibres is 6 mm., and the average diameter about 20 microns. Microscopically, the fibres largely resemble jute except that the central canal is large, regular, and much more apparent. The cells are thin-walled and transparent and most beautifully marked. The ends taper off to fine points. The fibre is distinguished by the presence of small rectangular cells with rounded corners, occasionally found in colonies of a curious "brick-wall" appearance.

Manila comes to the paper-makers' market in the form of old ropes, being largely employed in the rope-making industries. The fibre makes a very characteristic paper rivalled in toughness only by the Japanese paper mulberry, which in other respects it much resembles.

Wood Pulp.

The great bulk of the wood fibre used in this country for paper-making is derived from the wood of coniferous trees (pine, spruce, etc.), the wood of deciduous trees (poplar, etc.) being, however, largely used in America. The cells of coniferous wood (tracheids) average about 3 mm. in length and .03 mm. in diameter. They are transparent and thin-walled with well defined central canal and joints, and frequently show considerable "kinking" and bending. The joints are usually colorless in stained specimens and thus show up well. The fibre ends are pointed. Besides these fibres many are found of a flat ribbon-like appearance, something like cotton. This likeness is increased in many cases by the presence both of twisting of the fibre and of the lattice work marking of the cell wall, which are often so noticeable in cotton. The special characteristic of these fibres is, however, the presence of small circular ringed pits in the cell wall, more or less clearly defined according to the rigour of the chemical treatment of the pulp. In addition to these pits are seen larger elliptical pores which are usually better defined. The presence of these pits and pores, together with the distinctive coloring of the fibres with iodine, makes the microscopical appearance of wood fibre from coniferous trees highly characteristic.

The fibres of deciduous wood differ somewhat in appearance from those previously described, being shorter and having wider central canals. The ribbon-like cells marked with pores, which are such a strong feature of coniferous wood, are absent; but numbers of large and beautifully marked vessels are usually to be found associated with the cells proper.

The characteristics described above are those displayed by wood pulp which has been prepared for paper-making purposes by processes of chemical treatment to isolate the cellulose. In contradistinction to these characteristics must be noticed those displayed by wood pulp which has received no previous chemical treatment viz., "mechanical" or ground wood. Viewed under the microscope the particles of mechanical wood pulp are seen of all shapes and sizes, and betray their origin by their torn and irregular appearance. They show, however, the pits of pine wood as well as the medullary rays, which latter appear as dark bars lying at right angles to the long axes of the splinters. There medullary rays are not found in chemical wood pulp for the reason that the process to which the wood has been subjected destroys their individuality.

Chemical wood pulp presents the characteristics of cellulose in proportion to the extent to which the isolation has been carried in the cooking and bleaching processes, pulps reacting to phloro-glucine in proportion to the amount of lignified matter left unacted upon, and processes have been described for the quantitative estimation of this residual lignification. There are also slight chemical differences between the celluloses produced by the sulphite and soda processes which have been made the subject of research with a view to the differentiation of the pulps produced by these methods. The results however, are not sufficiently distinctive to be of much practical value. Iodine and sulphuric acid leaves chemical wood uncolored, while iodine and zinc chloride stains it blue.

Mechanical wood presents chemically the general characteristics of ligno-celluloses. Iodine gives a strong yellow or brownish yellow coloration, aniline sulphate yellow, and phloroglucine a vivid red. The pulp reduces Fehling's solution, restores the color of Schiff's reagent, and deposits metallic gold from a solution of auric chloride. A solution of di-methyl-para-phenelene-diamine gives a red coloration with mechanical wood pulp, while a solution of red ferric ferricyanide is reduced by it with the formation of Prussian blue. Strong sulphuric acid rapidly chars the fibre by the extraction of moisture, while a mixture of sulphuric and nitric acids produces an immediate brown stain on paper made from it. Schweitzer's reagent attacks it only slowly.

PAPER-TESTING, STRENGTH, BULK AND HANDLE

Paper-testing on a systematic basis was first developed in Germany under the auspices of what is now the Royal Prussian Testing Office. To this system we owe the practical establishment of the principle of classifying papers according to their relative or specific strengths per unit weight of the materials present in combination. The conception of "breaking length," in which this principle is embodied, has crystallised into a scale of standards available for immediate reference when the tensile qualities of any paper come up for consideration. The German paper industry has thus accustomed itself to think of strength in terms of breaking length. The paper-maker knows on this scale what are the limits of capability of any of his materials, what materials may or may not be employed to attain any given standard and how such materials must be treated to develop their capabilities.

Given the breaking length of any paper, its general character is partly defined and co-ordinated, but only in respect of its tensile resistance. The German system therefore, in applying the principle of classification by relative or specific qualities, stops at the quality of specific strength, but in order to characterise a paper more completely it is necessary to extend this principle to the quality of thickness or volume which, like the strength, is also variable with the substance of the paper. Specific strength and specific thickness (volume), then afford parallel scales of measurement by which most of the more important physical qualities of paper may be gauged.

Literature.

The German system of paper-testing is ably expounded in Prof. Herzberg's "Papierprüfung," amplified periodically by the Mitteilungen des Kgl. Materialprüfungsamtes.

In 1902 Messrs. Cross, Bevan, Beadle and Sindall published the "C.B.S. Units," in which the conception of breaking length as an expression of specific strength was criticised, but with no very fruitful result. The most valuable contribution in this book is the introduction of the idea of apparent specific gravity which is inversely proportional to specific thickness, as one of the determinant factors in describing the physical constitution of papers. In addition, a very practical method for calculating the percentage volume of air-spaces in paper was proposed and the significance of this factor was pointed out.

In 1907, Messrs. Cross, Bevan and Briggs at the Hauptversammlung des Vereins d. Zellstoff- und Papierchemiker admitted the correctness of the German expression of breaking length for specific strength, but advocated its use in combination with the conception of specific gravity for a more complete classification of papers according to their physical constitution.

In 1909, Mr. P. Veitch, U.S. Dept. of Agric., Bull. No. 89, proposed a system of paper-testing in which importance was given to the conceptions both of specific strength and specific thickness, thus combining the German and the English methods in a form modified to suit American conditions. I have adopted in this article many of Mr. Veitch's suggestions.

In 1913, in "Der Papier-Fabrikant," Mr. Pauli published a series of articles discussing the meaning of the English word "Bulk" and the German word "Griff," and suggesting the use of the calculated percentage air-space volume as an equivalent conception. In No. 16 of the same journal Herr Lutz pointed out that the word "Griff" corresponds more properly with the English word "Handle" and that "Bulk" is more correctly defined as specific volume or specific thickness. I am in perfect agreement with Herr Lutz.

Substance.

The "substance" of a paper is universally understood as the weight per unit area. In countries which enjoy the benefits of the metric system, this quantity is uniformly expressed in terms of grams per square metre for all papers. Different items are thus immediately comparable without calculation.

In America an attempt has been made to secure the adoption of a "standard ream" of 500 sheets, 24 ins. by 36 ins. (see Veitch, loc. cit.) for expressing the sub-

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Article in "Der Papier-Fabrikant" by Mr. J. P. Briggs, Markinch, Fife.

stance of paper and to calculate all the various sizes and weights in terms of pounds per standard ream.

In England there is no universally accepted standard for substance. Papers are described according to the size, weight and number of sheets in the packages (reams) as they are required to be delivered. It is not sufficiently recognized that some general standard of substance is required for many purposes totally unconnected with the retail trade package, which is subject to a confusing number of arbitrary variations. Papers on the reel are by custom described either in terms of pounds per 480 sheets "demy" (22½ ins. by 17½ ins.) or of pounds per 480 sheets "double crown" (30 ins. by 20 ins.), the "demy weight" being most commonly adopted in paper mills. All inquiries and orders received at the mill have to be calculated into "demy weight" before they can be passed on to the costing and manufacturing departments.

In English commercial circles there is absolutely no inclination to employ the metric units as a practical working system.

Breaking Length: Specific Strength.

The use of the expression breaking length as a measure of the relative strength-values of papers has never become general in the English trade, in spite of its great practical utility and in spite of the fact that English customs afford no equivalent conception in substitution.

The correct definition of breaking length is: That length of strip the weight of which is equal to the breaking weight, and it is calculated thus: If one metre-length of strip weighs W gms., and its tensile strength is S gms., then its breaking length is $\frac{S}{W}$ metres.

This ratio may be described as specific strength, or strength per unit weight of paper. As such, it is of the highest practical interest as a scale of measurement to the buyer of paper on the basis of strength.

In England and America the direct tensile strain is not so largely employed as in Germany. In these countries it is more usual in trade circles to determine the bursting strain in pounds per square inch on Mullen's machine.

For expressing bursting strain in terms of specific strength Veitch (loc. cit.) has proposed simply to divide the observed bursting strain by the weight per standard ream. Adapting this to English conditions, the specific strength would be expressed by the ratio—

$$\frac{\text{Bursting strain}}{\text{Demy weight}} = \frac{S}{W}$$

The specific bursting strain is thus an expression of the same order as the German breaking length, and fulfils the same useful purposes; it is a comparative measure of the number of strength units per pound of any paper, and forms a scale of standards for the classification of papers according to their strength.

"Bulk" is a word which has received a large number of definitions varying slightly in the conception conveyed. Herr Pauli is inclined to connect it with the percentage air-space volume.

The air-space volume, however, although it is a very important and useful factor, does not correspond with any common use of the word "bulk" in the paper trade. It is purely a volume conception which expresses certain important qualities of the paper (e.g., opacity, absorbency for water, grease, printing ink, etc.), which are quite independent of weight; and since the air spaces consist of pores, I consider the more appropriate term is "percentage porosity."

Again "bulk" has been defined by the ratio—

$$\frac{\text{Total volume}}{\text{Volume of solids}};$$

this also is a volume conception and expresses the extent to which the solid components of the paper have been "bulked-up" in the manufacture of the paper. Further, it has been argued that since the mineral components are incapable of being "bulked-up," the whole of the bulking work falls on the fibres, so that the above ratio is sometimes replaced by the ratio:

$$\frac{\text{Total volume,}}{\text{Fibre volume}}$$

but this expression requires the volume occupied by mineral matters to be regarded as equivalent to airspaces, and is not always valid.

All these suggestions are valuable as scientific conceptions in the study of the paper-making qualities of materials ,but they do not afford a satisfactory definition of the word "bulk" as a commercial term. In the paper trade the idea of "bulk" is always connected with the substance of the paper, and must be expressed by a ratio having weight as the denominator. A paper "bulks high" or "bulks low" in relation to its substances. Herr Lutz correctly recognizes this when he proposes to define "bulk" as specific thickness expressed by the ratio $\frac{\text{Thickness}}{\text{Substance}} = \frac{T}{W}$

In England, the thickness of paper is always measured in thousandths of an inch ("mils") and may be recorded either as the thickness of a single sheet, or as the thickness of four plies, or as thickness of a ream of 480 sheets. The measured thickness of several plies (generally four) is not always the simple multiple of the measured thickness of a single sheet, owing to the "grain" of the surface, and since thickness generally relates to paper in the form of a book, ream, or reel, I prefer to include the "surface error." All my measurements are recorded as the thickness of four plies of paper in thousandths of an inch. This, however, is purely a personal and arbitrary preference. Thus my records for "bulk" are expressed by the ratio—

$$\frac{\text{Thickness of 4 plies (in mils).}}{\text{Demy weight (in pounds)}}$$

These records of specific thickness are tabulated side by side with the records of specific strength for every lot of paper made in the mill, and steadiness of quality of the daily manufacture is thus controlled.

Handle.

The conception of "handle," corresponding with the German word "griff," is a subjective sensation which plays an important part in the commercial valuation of papers. In a commercial sense it relates to the subjective estimation of the substance of a paper without mechanical measurements. Thus, for instance, a paper which really has a substance of, say, 20 lb. demy is said to "handle well" if it gives the impression in handling that it may have a substance of, say 22 lb. or 24 lb. demy; that is, it gives an impression of good value for the money. In order to do this it is not sufficient that the paper should have a bulky handle; it must also have a firm, strong handle. Here also the factor of weight must come in as a denominator; a good paper must have a firm and bulky handle in relation to its substance. In this sense "handle" may be described as a combination of those qualities of a paper which are variable with its substance and may be represented by the compound expression specific strength+specific thickness.

In the system of records which I employ the "handle," or, as I prefer to call it, the "quality," of papers is represented by the expression—

$$\frac{\text{Bursting strain}}{\text{Demy weight}} + \frac{\text{Thickness of 4 plies.}}{\text{Demy weight}}$$

It is not permissible, however to add together these two values to obtain a single number representing "handle" or "quality," because they are arbitrary measurements of different orders of magnitude. The values must be ranged separately side by side. But for comparing two papers with one another, the percentage difference in specific strength, when added to the percentage difference in specific thickness and the sum divided by 2, will give a value expressing the percentage difference in "handle," or "quality," between the two papers.

With a given combination of materials these two factors tend to vary inversely as one another, and their absolute values represent to a large extent a measure of the paper-making skill exercised; skill in beating and skill in making on the machine. The relative values of the two factors, on the other hand, define the character of the paper, according to whether strength or bulk has been specially developed.

In the case of fine papers, however, a third factor intervenes generally affecting adversely the other two. This third factor is "smartness" of appearance or texture; it implies fineness and uniformity in the look-through, closeness, clearness of water-mark, and laid lines. This, unfortunately, is incapable of being recorded numerically, and must always remain subjective.

Application of the Tests.

(1) I may take first a practical illustration of the actual use of the word "handle" in commerce. This is afforded by a letter from a customer who says:—"Although sample B only weighs about 2 lb. per ream lighter than sample A, sample A handles at least 5 lb. or 6 lb. better than sample B.

The test showed:—

	Sample A lb.	Sample B lb.
Demy weight (W) . . .	50	48
Specific bursting strain $\left(\frac{S}{W}\right)$.	0.27	0.23
Specific thickness $\left(\frac{4T}{W}\right)$ . .	1.17	1.10

The percentage differences, taking sample B as the standard, show as regards strength a superiority of 17.4 per cent. (100 × 0.04 ÷ 0.23) in favor of A, and as regards bulk a superiority of 6.4 per cent. (100 × 0.07 ÷ 1.10) also in favor of A. The total percentage difference in "handle" is therefore $\frac{17.4 + 6.4}{2}$ = 11.8 per cent in favor of A, which exactly confirms the customer's subjective estimate of 5 lb. to 6 lb. on 48 = 11 per cent to 12 per cent. These were loaded cotton papers and the difference in quality was found to be due to an excess of mineral loading and short fibres in sample B.

(2) Esparto Writing Papers.—In Scotland we have a number of mills manufacturing esparto papers in competition under very similar conditions. Qualities are regulated by the "handle" and smartness of appearance, and costs by the quality of the grass used and speed of manufacture. There is little variation in the composition of these papers of the writing class, the proportion of ash, with few exceptions, being 16 per cent + 1 per cent. In the better qualities there is an admixture of less than 10 per cent of wood cellulose, and in the cheaper sorts there may be 25 per cent of wood cellulose, but more than this modifies the character of the paper too greatly. There is a difference in price between each quality of approximately 5 per cent. Some customers value handle more highly than appearance, others value appearance first and handle second.

Tests of Esparto Writing Papers from Different Mills.

Cream Laids.

No.		Demy Weight. W lb.	Specific Strength. $\frac{S}{W}$	Specific Thickness. $\frac{4\,T}{W}$	Look-through.
	1st Quality				
1	Mill A	22	0.80	0.75	very fine
2	"	32	0.75	0.70	very fine
3	"	36	0.83	0.73	cloudy
4	Mill B	25	1.00	0.68	good, close
5	Mill C	22	0.94	0.75	very good
	2nd Quality.				
6	Mill A	17½	0.72	0.77	good, open
7	"	24	0.80	0.66	good, open
	3rd Quality.				
8	Mill D	18	0.62	0.78	poor, open
9	"	23	0.69	0.68	poor, open
10	Mill E	22	0.77	0.68	good, fine
11	"	32	0.62	0.69	good, fine
12	"	36	0.60	0.62	good, fine

Cream Woves.

No.		Demy Weight. W lb.	Specific Strength. $\frac{S}{W}$	Specific Thickness. $\frac{4\,T}{W}$	Look-through.
	1st Quality				
13	Mill A	20	1.01	0.67	very fine
14	"	22	0.93	0.64	very fine
15	Mill B	23	1.11	0.62	good, close
16	Mill C	18½	1.28	0.75	very good
	2nd Quality.				
17	Mill A	20	0.72	0.77	good, open
18	"	24½	0.80	0.69	good, open
	3rd Quality.				
19	Mill D	18½	0.68	0.69	poor, open
20	"	23	0.79	0.71	poor, open

Considering now the above papers it must first be noted that Nos. 5 and 16, products of mill C, are really extra first quality; they combine maximum values for "handle" with brilliant appearance. Closer examination showed these papers to be exceptional, containing only 12 per cent of ash instead of 16 per cent. The percentage of ash has a very powerful influence on the handle.

Next it is seen that wove papers are generally better throughout in handle than laid papers of the same class. (Nos. 13-16), because in making a laid paper the stuff must be beaten more freely than in making a wove paper, in order to obtain a smart impression of the laid lines.

Further, in comparing the first quality papers of mill A with those of mill B it is to be noted that the superior "handle" of mill B papers is compensated by the superior "smartness" of mill A papers. This factor of "smartness" also differentiates the first quality papers of mill A from the second quality of the same mill; the "handle" is only slightly inferior, but the appearance at once distinguished the second quality papers.

Lastly, comparing Nos. 1 and 2 with one another and a similar series of third quality papers, Nos. 10, 11, and 12, it is to be noted that, as a rule, the "handle" or "quality" rapidly falls as the substance is increased, particularly with laid papers. This is because, with heavy substances, it becomes more and more difficult to preserve a smart appearance and clearness of laid lines. The stuff must be beaten shorter and freer in order that it may drain sufficiently on the wire to obtain a good impression of the dandy-roll. No. 3 is apparently an exception to this rule, having a "handle" at 36 lb. substance as good as No. 1 at 22 lb.; but the look-through immediately shows that a miscalculation has been made in the beating, the laid lines are very indistinct, and the stuff had evidently been prepared for a thinner substance. Nos. 10, 11, 12 show the normal decrease in handle with increase in substance, and an approximately constant smartness of appearance.

Papers of the third quality must be run at a high speed, with consequent lowering of handle or appearance, or both, owing to the freeness of the stuff. The papers of mill D show this in a very marked degree; those of mill E are better, particularly No. 10, which represents exceptionally good value for its class.

IMITATION PARCHMENT AND PERGAMYN

By H. FORS.

Written Specially for Pulp and Paper Magazine.)

These and similar paper qualities are at the present time paid more attention than hitherto, especially on the American continent, owing to the changed circumstances the war has brought us into, and a few words from my experience in manufacture of this paper may therefore be of interest on this occasion.

Imitation parchment and its neighbor, pergamyn, have during the past few years found very extended use for napkins, documents, map-printing, and as a splendid substitute for tracing-cloth, besides its numerous original applications, and their market, is still expected to see considerable extensions. The main producers of the paper in question have hitherto been Germany, Sweden and Norway. During recent years the United States has changed from being a great importer of this paper to being a producer of importance.

We know that pure cellulose follows the chemical formula: $C_{12}H_{20}O_{10}$, and by treatment with sulphuric acid of a certain concentration absorbs one molecule water, and is transformed into a new chemical product with the formula: $C_{12}H_{22}O_{11}$, which is a product of close texture and when formed into a sheet of paper, yields a very strong entirely water and grease-proof paper, unaffected by caustic potash or action of cold, weaker acids. This paper is what we call vegetable parchment.

Imitation parchment is from the chemical standpoint an entirely distinct product, but is so similar in appearance and physical properties, that the imitation in many, and perhaps most, cases has proved to be a satisfactory and considerably cheaper substitute for parchment.

The difference between imitation parchment and pergamyn is often totally ignored, and the very same product meant by these two different names. At all events, in reality by pergamyn is to be understood the lighter, extra calendered and highly transparent grease-proof paper, and by imitation parchment the heavier, usually only machine-calendered, product. Besides, there are in the market a lot of other names for special kinds or qualities of the above mentioned paper.

The material which is the very best, and nowadays almost exclusively used for manufacture of imitation parchment is pure, strong, unbleached sulphite pulp, obtained by the Mitscherlich process, that is, by comparatively slow cooking with indirect steam of low pressure, about 75 lbs., and acid of about 3.5 per cent total and 1 per cent combined SO_2. It seems certainly curious that such a strong sulphite pulp should be used, when at all events the pulp fibres have to be ground to a size, often smaller than to be visible by the naked eye, but this proves to be necessary for allowing sufficient beating of the pulp in the hollanders and thus securing a superior paper. For inferior grades of imitation parchment, when, for instance, used for wrapping purposes and without demand for higher transparence, often ground wood pulp can be mixed to a smaller extent with the sulphite pulp in order to reduce the price of the paper.

Imitation parchment as well as Pergamyn must be perfectly sized, but this is attained usually by the consumption of surprisingly small quantities of rosin and alum, regularly 2—4 per cent, calculated on the dry product, and for superior grades, where enough and proper beating of the pulp takes place, there is almost no need of addition of rosin at all.

In the production of pergamyn the addition of a little glycerine to the pulp in the beaters is sometimes advisable, not only to increase the grease-proof properties of the paper, but also to relieve the calendering and to obtain a smooth supple paper with a shiny appearance. The employment of so-called "stearin porridge," consisting of 50 per cent stearin and 50 per cent borax cooked together, has the same action as glycerine.

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Necessary dye-stuffs, nowadays exclusively aniline colors, carefully dissolved in hot water, are added to the pulp in the usual way.

The pulp solution in the beaters is to be kept considerably thicker than usual, about 7—9 per cent, the larger figure being desirable in the grinding of pergamyn.

Otherwise grease-proof paper is manufactured mainly by the same processes and machines as is other common paper. With some modifications, however, the grinding of the pulp is, as said before, the most important and decisive factor and an extremely sensitive work, that takes years to learn. The beating engines ought to be simple and easily handled, of theoretically correct design, especially in regard to the form of the trough and the weight of the roll, which is to be in proportion to the size of grinding surface, and should be adjustable by counterweights. Basalt lava stone may be used to advantage for flybars as well as for knives in the bottom of the trough. If steel knives are employed, these must be at least ⅜ inches thick, and a little blunt, in order to effect a real beating, crushing and flaking of the pulp fibres to miniature fibres instead of grinding and cutting them to a snuff.

We mentioned above, that cellulose by absorption of water in a chemical process was transformed into vegetable parchment. The manufacturer of imitation parchment ought to keep this in mind. It is certainly not possible to deceive the laws of nature, but practical experience as well as carefully executed examination of the beating process has shown that the surface of the fibres by prolonged beating is transformed and really hydrated in a similar way as when treated with sulphuric acid, and this fact is the foundation on which the successful imitation of parchment has been built and developed.

During the beating process the beater roll is to be lowered by degrees to the full extent. The beating takes a long time, not very seldom 12 hours, and, as the beating goes on the temperature of the pulp solution rises, sometimes to 100 deg. F., effecting only good. The beaten pulp is, of course, very greasy, and for superior pergamyn almost similar to thick oil.

When beaten in the Hollanders, the mass has to pass through one, or better, two Jordans for the purpose of getting a finishing brushing. But to replace the beaters by Jordans in order to shorten the grinding time, will never succeed in production of superior imitation parchment, and attempts in this direction have evidently more or less failed.

The paper is certainly not at all easy to work in the paper machine, and here, if at any time, is an opportunity for the machine-tender to show his skill. The paper machine used for making grease-proof paper has always a very powerful Fourdrinier wet part with a long wire, six to eight suction boxes and four presses. Eventually a couple of the suction boxes can be replaced by rotary brushes. The first pressing must be gentle and increase from press to press. In the same way the paper must be dried slowly and gradually in order to prevent the formation of bubbles or wrinkles. It is further advisable to lap paper strips round the ends of some of the drying cylinders to prevent the edges of the paper from drying too quickly. The paper is then finished in the usual way.

The Automatic Paper Box Company, Limited, of Toronto, has been granted a federal charter, with a share capital of $125,000.

Ottawa Notes

Ottawa, Ont., January 14—The complaint of Auger and Son and the D'Auteuil Lumber Company against the proposed advance in rates on pulpwood to Mechanicsville via the Boston and Maine Railroad, which have been published both by the Canadian Pacific and Grand Trunk Railroads, was scheduled to come up at a meeting of the Railway Commission held in Ottawa last Tuesday. The case was adjourned, however, to a future sitting when the applicants will ask to have the rates disallowed as not being warranted by the traffic situation.

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Members of the lumber and paper trades in the Capital have figured very prominently in municipal affairs of late preceding the election held last week. This has been the case because of the chief part played by the question of a source of water supply and because as a result of present unsatisfactory facilities in this regard, lumber and paper manufacturers were lately required to pay an advanced insurance rate. At any rate a recommendation made by a committee of the city's most prominent insurers including representatives of all the leading paper firms in the city, for an overland pipe from Lemieux Island in the Ottawa river bids fair to solve this vexed question as no previous suggestion has succeeded in doing. This recommendation was embodied in a report which has been endorsed by practically all the successful candidates in the election held last week, as a temporary scheme which should be adopted for some years until the city was in a position to finance a permanent plan.

Mr. J. R. Booth was chairman of the insurers' committee which succeeded in getting this suggestion adopted while Mr. J. B. McRae, engineer for the E. B. Eddy plant, was a member. All the prominent lumbermen of the city were also among its personnel.

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With a view to minimizing accidents to workmen, which will be a heavy source of expense under the Provincial Workmen's Compensation Act passed by the Ontario Legislature last session, lumbermen in this district have organized a safety organization. A charter has been obtained and the following provisional board of directors elected: J. R. Booth, president; Sir Henry Egan of Ottawa, Senator George Gordon, of Cache Bay, J. C. Bigwood, of Toronto and Dan McLachlin of Arnprior, Ont., directors. The association will appoint inspectors and carry on a safety first campaign throughout the plants owned by its various members.

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Canadian trade returns for the twelve months ending October last, which are the latest available, indicate that imports of paper into this country have decreased while exports are larger. During the twelve month period, according to the Trade and Commerce Department, imports amounted to $6,876,637 of which [illegible] was from the United States as compared with the 1913 figures of [illegible]. Exports in 1914 were [illegible].

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In accordance with legislation which went into effect on January 1 of this year, the Eddy Company no longer manufactures white phosphorus matches. These are now prohibited in Canada on account of the disease "phossy jaw" [illegible].

—Mac.

The Settler and His Pulpwood

"Its an ill wind which blows no one any good" is a trite saying, the truth of which the settlers of Northern Ontario, especially those along the line of the Transcontinental Railway, are beginning to realize at the present time. The war, which is causing so much bloodshed, suffering, desolation and sorrow throughout Europe is proving, strange as it may seem, a blessing in disguise to the New Ontario homesteader, and will do much to bring about that which the Provincial Government so much desires, namely, the conversion of the existing vast timber areas into fertile agricultural land.

In previous years the settlers along the Transcontinental Railway, each holding 150 acres of land thickly covered with magnificient spruce and balsam, have as a general rule scoffed at the idea of disposing of this material for pulpwood purposes. A few of them tried it, but the verdict was almost invariably "It doesn't pay"; in fact one or two of their number who went into the business on a fairly ambitious scale, found themselves, at the end of the season, with a balance on the wrong side. So the average settler preferred each fall and winter to chop down the timber on the few acres of land which he is required to clear annually under the homestead regulations, and set fire to it the following spring and summer. Thus, not only did large quantities of pulpwood go up in smoke, but it is safe to say that many of the fires started in this way ate their way beyond the limits of the particular homestead on which they originated and, before the summer was out, had been responsible for some of the big bush fires which have caused so much damage in the north country in recent years.

Broadly speaking, the complaint of the settler that it "didn't pay" was correct. This was due rather to defective transportation facilities than to any other cause. The best price hitherto offered along the Transcontinental Railway has been $3.75 f.o.b. Cochrane. For those holding homesteads in the immediate vicinity of that town there is a small profit in pulpwood at that price, but much of the land close to the town is held by men who are not actual settlers, or residents on the land, but professional men and storekeepers, who after paying for labor, would receive little or nothing in the way of profit, and certainly not sufficient to warrant the trouble it will entail for the actual settler—the man who not only lives on the land, but is clearing it and chopping the timber with his own hands, how does the price of $3.75 per cord work out? It little more than pays his wages (and poor wages at that) leaving him practically nothing for the value of his pulpwood, which he has usually regarded as a fairly valuable asset which would help to meet the cost of clearing his land.

If he lives a few miles east or west of Cochrane he has to reckon with the railway contractors, who have been constructing the Transcontinental Railway and who continue to run trains irregularly over the line, pending the taking over of the undertaking by the G. T. P. or other concern. As an example of the charges demanded by these contractors, it may be mentioned that the settler living six miles out from Cochrane has to pay six dollars for a car of pulpwood into that town. Roughly speaking 45 cents of the $3.75 is eaten up in this short haul. Settlers living still further out have to pay higher proportionately, the six dollars per car being the minimum charge. Very few settlers at the present time own their own teams, but those who are thus favored charge their less fortunate brethren at the rate of 75 cents a cord where the distance is from half to three-quarters of a mile from the track up to a dollar and $1.20 a cord where the distance is a mile and a half or a trifle more. The charge may seem high at first blush, but the cost of keeping horses is very high until sufficient land is under cultivation to bring the prices of hay and corn down. To load on a car at the siding the usual price paid is twenty-five cents a cord. Thus the settler living six miles from Cochrane and a mile and a-half north or south of the track has to meet the following expenses before he can get his pulpwood into town:—

	Per Cord
Hauling to track	$1.20
Transportation to Cochrane	.45
Loading on car	.25
Total	$1.90

This leaves $1.85 cents for labor and the value of the pulpwood. The price paid throughout the district is $1.50 a cord for cutting the pulpwood, so that the settler receives for the value of his pulpwood thirty-five cents a cord, out of which he has to allow for contingencies and a certain amount of culls. Now that the snow is fairly deep, and with so much undergrowth, it is a good man who can cut a cord a day. The average settler cannot cut that amount, so that in the end he is making meagre wages and receiving practically nothing for his pulpwood.

Such has been the general outlook in this district in the past. Prices have not advanced and yet since the outbreak of the war nearly every settler has been busy cutting pulpwood and is unusually interested in the work. Why? The only answer to the question seems to be that rightly or wrongly he thinks that the increased demand for pulpwood which the war has brought about will result in a corresponding increase in the price, and he is, so to speak, busy trying to "make hay before the sun shines." He may be disappointed, but in any case it is to be hoped that the experiment will teach him that even at a small profit it is better to sell his spruce and balsam, which he has to cut down in any event, rather than burn it, as has been the general practice in the past.

Attention has been called to the fact that settlers along the line of the Transcontinental Railway are at present showing unwonted activity in the cutting of pulpwood on their lands. The question arises as to how long this activity will continue and whether if the experiment does not prove as successful as they anticipate, the situation will not revert to that which has hitherto existed, namely, the burning of huge quantities of spruce and balsam every year, instead of its being shipped away to the mills for manufacture into pulp.

When the settler first enters into possession of his land, and surveys the enormous quantities of magnificent pulpwood at his disposal, his first impression generally is, "There is a fortune in this. There is money in every stick of timber here." To the non-practical man that is a very natural conclusion to arrive at. As it stands it DOES look to be worth a small fortune, but the settler's dream vanishes when he comes down to practical business, and finds that although at the mills the fine array of stately trees which surround him on every side woud net him a big sum, yet

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Contributed specially to the Canada Lumberman by a Northern Woodsman.

after he has done the chopping and paid for the cost of hauling, loading and transportation all he gets out of it is meagre wages and nothing, or practically nothing for the value of the material. He usually decides that it is cheaper to burn what he has chopped than to cut it into proper lengths and trim it ready for shipment.

The writer, in visiting a number of settlers in the vicinity of Cochrane recently, called upon settlers who at one time boasted of the fine pulpwood they possessed. To the question: "Are you cutting any pulpwood this winter?" they have replied with absolute glee and triumph: "Pulpwood? I haven't any pulpwood now. The fire went through it last summer and destroyed it all. It's the finest thing that could have happened. It has saved me fifty per cent in the cost of clearing my land."

That is the general view of the settler in regard to the pulpwood question. He no longer contemplates the bush fires with dread, but hails them as a positive Godsend. Whilst the fires are actually raging he may feel anxiety concerning the safety of his shack and its contents, but if he can save his little home, and the fire travels all over his land, leaving nothing but a forest of ugly blackened tree trunks, he reviews the situation with rejoicing, and enters his homestead duties with a lighter heart than ever before.

One is continually hearing the remark, "It is only by a series of good bush fires that this country will be cleared and converted into agricultural land."

So long as this is the attitude of the settler, and so long as he continues to regard the pulpwood on his land as a positive obstacle to him, rather than as an asset which will help to pay the cost of clearing his land so long we may expect to find the north country ravaged by big bush fires every year. Each summer, the settlers will be setting fire to the cut timber on their own homesteads. If the confragration were confined to the limits of the particular homestead, the matter might not be serious, though even in that instance it seems regrettable that so much valuable material should be destroyed for lack of adequate means of shipping it away to the mills. The trouble is, that there is no telling where these settlers' fires end. Many homesteaders are extremely careful when they start a blaze and never leave it until they are convinced that everything is safe, but, too frequently, the fire gets beyond their control, spreads beyond the limits of their holding, and travels for miles, burning itself out no one knows where. Or if the settlers keep the flames well in check, they are satisfied everything is safe when only a few smouldering patches remain. Therein lies the danger. The writer last summer saw half the town of Hearst destroyed by a little smouldering patch, a few inches square which, in the morning was so insignificant as to excite no attention, but which in the afternoon, fanned by a gale of wind assumed proportions which "all the king's horses and all the king's men" could not subdue. Too frequently it is the little smouldering patch which causes the damage, for when once a fire gets its way into the soil it is wonderful how long it will remain burning and be a menace to the surrounding bush.

An instance of how long a small fire in the bush will remain burning. Towards the end of last October the writer passed a certain spot where he noticed a small patch of smouldering muskeg. That night a torrential downpour set in and continued for twenty-four hours, flooding the recently-cut government roads. It was a downpour which anyone would have thought would have extinguished the fiercest blaze. But the day after, that little patch of muskeg was smouldering away as merrily as ever. Two weeks later the writer again passed the same point, after another deluge of rain, which, in the night had turned to snow, of which there was a sufficient depth on the ground to permit of toboggans being drawn with ease, but the little patch of muskeg was still emitting small volumes of smoke. Instances of this kind could be quoted ad infinitum.

There seems to be a need for a Provincial Government to adopt some new policy on the whole question. Their desire is, no doubt, to conserve the pulpwood supply as far as possible, and at the same time to get the land which they are selling for homestead purposes cleared as quickly as possible. They have the whole line of route of the Transcontinental Railway patrolled by fire rangers each summer to guard against fires which may be caused by sparks from the engines of contractors' trains, yet they pay no attention to the big conflagrations deliberately started by settlers. The amount of pulpwood which the homesteaders destroy annually, rather than go to the trouble of shipping to the mills, is considerable, but it is a mere bagatelle when compared with the thousands of acres destroyed by the fires which they start, and which sometimes travel many miles beyond their homesteads, to regions where there is no settlement, and where there is not likely to be any settlement for years to come.

The main thing is to get the settlers interested in the pulpwood business, so as to induce them to ship their spruce and balsam away to the mills. They need some sort of education in the matter, and the Government would do well to issue a few simple instructions as to the best methods of cutting, piling, loading, hauling and handling pulpwood generally. Few of the settlers are experienced bushmen, and adopt methods which would never prevail in a lumber camp. In the cutting of roads, for instance, they frequently show a lack of discretion with the result that they have a road which will not permit anything like a full load to be drawn over it.

Of course, one of the greatest drawbacks at the present time is the high charge which the contractors demand for hauling the pulpwood over the Transcontinental Railway into Cochrane. When the line is in proper operation these charges will be greatly reduced, and this will afford that extra margin of profit to induce the settler to ship away his pulpwood rather than consign it to the flames. However, if the vast timber areas north and south of the railway are not to be wholly destroyed some more effective steps must be taken for their conservation.

VALUE OF SCIENTIFIC FORESTRY.

The aim of forestry is to bring the forest up to its highest state of productiveness and keep it there. In the United States, where forestry is not practiced except on Government and State lands, the estimated annual production is 12 cubic feet per acre.

In Canada the average rate of growth is unquestionably materially less than this, the climatic conditions being, on the whole, less favorable.

In Saxony, where forestry has been practiced for many years, the annual production is 93 cubic feet. According to experts the rate of growth in Canada as well as the United States could undoubtedly be multiplied several times over by the adoption of proper forestry methods, of which the most essential at the present time is efficient fire protection.

WHO'S WHO IN THE CANADIAN PULP AND PAPER INDUSTRY

CHARLES V. SYRETT, Managing Director and Secretary, Victoria Pulp and Twine Co., Ltd., Toronto.

"Is the Manager in?"

"Yes."

"May I see him please?"

"You are talking to him now." The visitor, who was the representative of an Old Country paper firm on a first visit to Canada, was calling at the warehouse of the Victoria Paper and Twine Co., Limited, Toronto, one of the largest concerns of its kind in the Dominion and rather hesitatingly observed: "Pardon me, sir, but I mistook you for a junior clerk."

"Can't help it if my looks are against me," was the pleasant reply of Charles V. Syrett, Managing Director and Secretary of the Company, "but I have been fifteen years in this business."

A few years ago some of his friends gave him the title of "The Boy King of the Paper Trade," and it stuck. But Canada is a young man's country, and youth is no barrier to advancement or responsibility. Under Mr. Syrett's direction there are to-day a force of eight travellers, in Toronto and Ontario, one western representative and a branch in Montreal, and within the last six years, the Victoria Paper and Twine Co. have had to remove three times—on every occasion to larger and more commodious premises, so rapid has been the expansion of business. When first organized they were located at 46 Colborne Street, Toronto, with a floor space of about six thousand square feet. Shortly after, they occupied a three-storey warehouse at 415-417 King Street West, which afforded 16 thousand square feet, but within two years this area was too cramped and outside quarters had to be secured for storage. In April last another move was made to the splendid and admirably equipped new warehouse of the company at 439-441 Wellington Street West, Toronto, which, in the substantial nature of the structure, the convenience of its equipment and arrangement of the large stock carried, will compare favorably with any in Canada or the United States. In dimensions, it is 50 x 210 feet, furnishing about forty thousand square feet of space, and the stock carried is an immense one, both in tonnage and variety, taking up every available inch. The company handle practically everything in the paper line with the exception of book and writings. They are looked upon as headquarters for unique and uncommon wrappings and deal chiefly in wrappings of all kinds, kraft, parchments, greaseproof, newsprint, tissue and toilet paper, waxed, building papers, paper towels and napkins, paper bags, paper specialties, twines of every kind, butter dishes, pie plates, clothes pins, matches, straw and box boards, etc. The company are selling agents for the Garden City Paper Mills Co., Limited, of St. Catharines, the Continental Paper Bag Co., and the Dustbane Manufacturing Co., and are also the direct and sole selling representatives in Canada of several large English twine mills, European paper mills and American mills, being one of the biggest jobbing houses in the Dominion. Three years ago the Victoria Paper Goods Co. was established at 80 Colborne Street, Toronto, for the making of hand and machine bags and specialties but, when the Victoria Paper and Twine Co., Limited, entered their new home, this portion of the business was sold in order to devote all the energy and attention of the firm to the selling end rather than to the manufacturing.

Under the able direction of Mr. Syrett, and by perseverence and close application, the present large business has been built up on progressive principles and in the spirit of co-operation and harmony among the members of the staff. The development has been an exemplification of the old adage of "a long pull, a strong pull and a pull all together," for the interest of the house and its numerous customers. Another source of its strength is that the Managing Director is of the opinion that the wholesalers should work wholeheartedly with the manufacturer, for the permanent success of any jobbing house, and its continued prosperity depend to a great extent on cordial and sound relations with the manufacturers. Mr. Syrett believes that the jobber and the producer should maintain a reciprocal policy of "give and take," making mutual concessions and upholding at all times the welfare and standing of the trade. There is nothing gained by pulling apart, adopting a dictatorial or highhanded attitude and, when either wholesalers or manufacturer begins to think he is "the whole thing," then friction frequently results. The old axiom of a house divided against itself not being able to stand is demonstrated, the interpretation in this case, including both the mill and the selling agents.

A few months ago the editor of one of the leading paper trade publications of the Continent paid his first visit to Toronto and, in a long article on the trade, made the following appreciative remarks relating to Mr. Syrett:—"He is looked upon as a 'live wire' and, after spending a half hour in conversation with him, you will agree that this characterization is entirely correct. He is a very progressive merchant and one who is exceedingly well informed on the paper industry, and the success of the Victoria Paper and Twine

Company has been great. Their warehouse is a model in every respect."

Born in Camberwell, Surrey, England, the subject of this reference came to Canada when eleven years old. He went to school at Ottawa for a short time, and removing to Toronto attended the local institutions of learning. His first job was with the Canada Paper Co., Limited, who were then located at 15 Front Street West, where he started as office boy and improved his leisure hours by going to the Y.M.C.A. night school, taking up shorthand, bookkeeping, French and other subjects. When he entered the service, Mr. F. J. Campbell, now General Manager of the Canada Paper Co., was in charge of the Toronto warehouse, and on his removal to Windsor Mills, Que., was succeeded by Mr. H. B. Donovan, general sales manager of the organization. Mr. Syrett worked for a while in the warehouse, then was given the order desk; next he was stenographer and assistant bookkeeper, remaining with the company several years.

After receiving a thorough grounding in all departments of the paper business, and saving his money, he was anxious to launch out on his own behalf. Having become well acquainted with Mr. William H. Howe, of Hubbs and Howe, who then had a branch in Toronto, that gentleman invited him to come to Buffalo with the idea of linking up with his firm who have paper houses in New York, Philadelphia, Rochester, Buffalo, Pittsburgh, Baltimore, Richmond and other cities, each house being a separate organization. After some negotiations and realizing that such a strong connection was a rare opportunity for any young man, a satisfactory arrangement was effected and in January, 1909, —just six years ago—the charter of the Victoria Paper and Twine Company, Limited, was obtained, superseding the firm of Hubbs and Howe in Toronto. From this date the story of the business has been told with Mr. Syrett as a shareholder, manager and secretary of the organization.

Outside of the business, in which he takes the deepest interest, finding infinite pleasure in hard work, Mr. Syrett has always been fond of athletics and in the Y. M. C. A. for many years was a leader in apparatus work, wrestling, indoor and outdoor sports. When he joined the ranks of the benedicts four year ago, he naturally gave up many of these pastimes but there is one hobby to which he still clings and that is sailing. It is his chief recreation. An active member of the Board of Trade he is one of the representatives of the paper interests on the committee of one hundred. He is also a member of the Canadian Manufacturers Association, a member of the Masonic order and a Mystic Shriner—and in years of age just thirty.

U.S. POST OFFICE CONTRACTS

(Special to Pulp and Paper Magazine.)

Washington, D.C., January 14, 1915.—The bids for furnishing the Post Office Department with stamped envelopes and newspaper wrappers for four years beginning July 1, 1915, were opened on January 5. There were three bidders for the work and one of these withdrew just prior to the opening of the proposals. The committee in charge of the bids consisted of Daniel Roper, Joe F. Johnston and William C. Wood.

The bidders were the Mercantile Corporation of New York, the National Envelope Company, Inc., of New York and Washington, D.C., and the Middle West Supply Company of Cleveland, Ohio. The National Envelope Company, Inc., was the bidder which withdrew.

The contract was held for the last four years by the Mercantile Corporation. While the awards have not yet been announced, it is probable that the Middle West Supply Company will be given the contracts for the entire lot as they were the low bidders by a wide margin on all items compared with the bids of the Mercantile Corporation. The lowest bids were in every case considerably below the quotations of four years ago. During the last four years, the business has aggregated more than $8,00,000.

New Brunswick's First Paper Mill Burned

The plant of the New Brunswick Pulp and Paper Company at Millerton (N.B.), eight miles from Newcastle, was totally destroyed by fire on January 1st, at a loss estimated at $150,000, and of the many buildings the chemical plant and a portion of the boiler house alone remain standing. There was heavy insurance on the place, and the majority of it is held by St. John firms.

The fire broke out about 8.30 o'clock in the morning, flames issuing from the office section. The apparatus in connection with the plant was got in working order as quickly as possible, but, fanned by a high wind and assisted by severe weather, the flames spread rapidly and the whole place was a roaring mass in less than an hour. It got beyond the fighting stage for the rude little apparatus, so that in a brief time nothing could be done but watch the main plant being devoured. The Newcastle fire department responded to the call in time to save the two buildings which remain standing.

The watchman reported that he had been in the office fifteen minutes before the fire was discovered, and at that time found everything all right. He could give no explanation for the fire and the origin seems to be a mystery to everybody.

J. Volckmann, manager of the company, stated that he had no idea yet what action would be taken by the company. It was expected that the plant would be opened again in the spring and in fact new machinery had been ordered for this purpose. He could not say whether the directors in London would issue instructions to have the plant re-built but he was waiting for orders of some description. Sir Robert Perks, the eminent engineer, is heavily interested in the project.

The mill was built by James Beveridge, the pioneer of the paper making industry in New Brunswick, the paper first manufactured, "kraft," became fairly well known in the trade of the maritime provinces. Shortly before the war a reorganization was effected, and with additional capital improved machinery was being installed. Depressed conditions due to the war caused a temporary suspension and 100 men were thrown out of work.

Mr. Volckmann looked forward to starting the mill again in the spring with the improved machinery, he said the destruction of the mill comes as a severe blow to the Miramichi. The feeling is expressed, however, that ultimately the company will rebuild, either at Millerton or at Newcastle.

It is understood that the insurance amounts in the vicinity of $125,000.

W. H. Rowley Dies Suddenly

Toronto, January 12th, 1915.

The pulp and paper industry of Canada will learn with great regret of the death of W. H. Rowley, president of the E. B. Eddy Company, of Hull, and ex-president of the Canadian Manufacturers' Association. Mr. Rowley died suddenly in the Alexandra tea room of the King Edward Hotel shortly after six o'clock to-night. Rupture of an aneurism was the cause of death. He visited the tea room with a friend and became suddenly unconscious, expiring a few minutes later.

The death of Mr. William Horsley Rowley, in his 64th year, removes from the business and financial realms of Canada one of the most extraordinary personalities that was ever in them. He was a man of remarkable executive ability—a veritable genius as a business man. As president of the E. B. Eddy Company, of Hull, he was the head of the largest industry of its kind in the British Empire. It was he and Mr. George Millen, who for several years has been joint general manager with Mr. Rowley, that brought the Eddy Company's business to be the success it now is.

Mr. Rowley was not only active in manufacturing circles, but in every public cause worthy of assistance or support. The Anglican Church in Canada never had a more ardent and sincere worker than he. For many years he was a member of Christ Church Cathedral, and as its representative was a delegate to several synods and congresses.

The late Mr. Rowley was born in Yarmouth, N.S., on March 21st, 1851. His parents were Lieut.-Col. John W. H. Rowley, and Anne Norman Farish, both of Yarmouth, and of English descent and U. E. Loyalists. At the age of 16 he entered the Bank of Yamouth as a clerk, after graduating from the Royal Military College, Halifax. He remained with that bank until 1871, when he joined the staff of the Merchants Bank of Canada, for which he did good service in Montreal, Windsor, Kingston and Ottawa. In 1880 he was appointed manager of the Ottawa branch of the Merchants Bank, a position he held until 1887, when he joined the staff of the E. B. Eddy Company as secretary-treasurer. As such he continued until the death of Mr. Eddy in 1906, when he was elected president of the company and general manager, jointly with Mr. Millen.

Soon after he became connected with the Eddy Company he began to make his personality and ability as an executive and financial genius evident. He was frank and fearless, and once he took hold of a thing he did not let go until he had seen it through to a successful issue. It needed such as he to help guide the destiny of such a big industry as the Eddy Company after it was almost wiped out in the big fire in 1900. He and his co-directors soon gathered up the loose ends caused by that fire and replaced the old buildings that were destroyed by new ones that would meet the demands of progress for many years ahead.

Deceased was elected vice-president of the Canadian Manufacturers' Association in 1910, and the following year was elevated to the presidency. In that office his ability was manifested to the general advantage of the big organization that has under its wing practically all the substantial manufacturing concerns in the Dominion. In 1909 he went to Sydney, Australia, as a delegate from Canada to the Commercial Congress of the Empire. The same year he went to Richmond, Va., as a delegate from the Anglican Church in Canada to the Protestant Episcopal Convention. The year previous he went to London, England, to represent the Pan-Anglican Congress. He was a member of the Chapter and treasurer-senechal of Christ Church Cathedral. He was also active in a number of charitable organizations in Ottawa.

In politics Mr. Rowley was a Conservative and an ardent Imperialist, also a staunch Canadian. He was a strong supporter of the policy which had for its object the conservation of natural resources of Canada for Canadians.

He was twice married, the first time to Grace Richardson, of Windsor, N.S., in 1876, and the second time, in 1911, to Miss Elsie Wildman, daughter of the late Chief Justice Sir William Ritchie, of Ottawa, by whom he is survived. He also leaves two sons, John, aged two years, and Roger, seven months; three brothers, Charles, manager of the Canadian Bank of Commerce in Winnipeg; Harry, manager of the Union Bank in Vancouver; Robert, of Montreal, chief inspector of the Bank of Montreal; one sister, Miss Vera Rowley, of Montreal.

THE THINNNING OF PAPER STUFF.

Prof. E. Kirchner writes as follows in the "Wochenblatt": In testing the Riegler and, later, the Schopper-Riegler, apparatus for testing the degree of beating I searched in my handbooks and in our literature for information on the thinning of the stuff on the paper machine wire. I knew there was a great difference in the thickness of the stuff according to whether a thin or thick paper or board was to be made on the Fourdrinier machine. I found no exact figures n the amount of dilution, and communications with practical men brought no definite result.

I asked several friends who were operating mills to answer this question by experiment.

Some of the appreciated replies gave the following:

Rag blotting paper free from clay contained 4.9 Gm. per liter, equal to 0.49 per cent pulp, therefore diluted 204 times.

Newsprint paper, 50 grammes per square meter (31.75 lb. 24 × 35 = 500) contained 8 Gm. per liter, equal to 0.8 per cent pulp, therefore diluted 125 times. This sheet was made at a speed of 165 M. per minute (540 feet).

Better papers contain 13.5 to 15.5 Gm. per liter, or 1.35 to 1.55 per cent pulp, equal to 74 to 64-fold dilution.

From these few examples it is evident that some factors which influence the dilution are the kind of stuff and the kind of paper, the fineness of the wire, and the speed at which the paper is made.

FAVORABLE TREE GROWTH.

The past summer has been very favorable to tree growth and many of the forest species of N.Y. State have produced a heavy crop of tree seed. The State College of Forestry at Syracuse is collecting a large quantity of seed of various evergreens and hard-woods. Among the evergreens the hemlock and balsam fir have seeded especially profusely. Effort is being made to get large quantities of the seed of white ash, basswood, tulip, or white wood and other hardwood trees of value. The students are collecting a considerable quantity of seed in the vicinity of Syracuse as a part of their laboratory work. They are taught the best methods of collecting, estimating the amount of seed to the pound and stratifying for the winter.

UNITED STATES NOTES

(Special to Pulp and Paper Magazine)

In speaking of the forthcoming annual statement of the International Paper Co. an official this week said that while it will be impossible to get any definite line on earnings for the past year, the company will probably show no material change from those of 1913, when a balance available for dividends equivalent to 4.43 per cent on the $22,406,700 preferred stock was shown. During the past year the Company's total sales are said to have shown little change from those of 1913, while operating expenses have been slightly higher. Following the outbreak of war in Europe an impetus was given to newsprint sales but this has been practically offset by the subsequent falling off in demand. Previous to the beginning of hostilities in Europe, the International's sales have been somewhat better than those for the corresponding period of 1913. During the past month the company has renewed many of its expiring contracts on the same basis as 1913, 2.15 cents per pound. Most of the company's current contracts will expire by the beginning of March and it is expected that they will all be renewed at the old price. A few months ago it was thought that the company would demand a higher price for 1915 contracts but the falling off in advertising has played an important part in the company's action.

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A wholesale grocery concern that supplies wrapping paper to 75 per cent of the retail dealers in Niagara Falls, N. Y. and the small adjacent towns states that all paper is purchased through Canadian jobbing and importing houses. And of the 35 or 40 tons disposed of annually only 20 per cent is American manufacture.

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Judge George W. Ray of the United States District Court has confirmed the report of the receivers of the Battle Island Paper Company, Fulton, N. Y., and has granted an order for their discharge. The receivers were David F. Costelo of Syracuse and Chas. N. Bulger of Oswego. They were appointed May 16 last and on July 10, Mr. Costello, Mr. Bulger and Nelson P. Bonney of [illegible] were elected trustees. The amount of the property taken over by the receivers was $2,460,215 and [illegible] the appraised value of the property in Oswego County $194,218; cash $36,706; appraised value of [illegible] $40,250; property in Canada, $381,000, and a claim against the State for barge canal damages, [illegible]. In the receiver's hands there remained [illegible].

* * *

Scarcity of water in the St. Croix River is causing manufacturers of paper and other mill owners in Maine worry as it is possible that industrial curtailment may result if conditions do not improve in the near future. Very little rain fell in the autumn, with the result that the lakes and streams are at a low pitch.

* * *

The Bagley and Sewall Company of Watertown, N. Y., manufacturers of paper mill machinery, is now manufacturing a machine which means employment to a large number of extra men. The machine, patented in this country and abroad, is expected to prove an important factor in the manufacture of paper. The demand for it is expected to create a separate factory.

* * *

American newspapers may soon be printed upon paper made from cornstalks. Following a series of experiments made by paper mills at the instance of the government, it has been announced that the product of cornstalks is an excellent substitute for wood pulp, while it can be brought to the mills at definitely less cost. So successful have been the experiments that the Bureau of Plant Industry at Washington has sent a representative, George A. Stewart, to interview farmers concerning the price to be asked for stalks, and also to get data regarding the expense of hauling to the paper mills. The supply of cornstalks is practically unlimited. Millions of tons are burned every year by farmers, an enormous waste which has long been the concern of thoughtful men, but for which, apparently, there was no remedy. Mr. Stewart is exhibiting samples of paper made from cornstalks some of it of a quality suitable for books and magazines, and he would be willing to pay $5 per ton for stalks.

* * *

The L. L. Brown Paper Company, of Adams, Mass., has filed a complaint with the Interstate Commerce Commission against the Boston and Albany Railroad, et al, alleging that the 31 cent per 100 pounds rate charged on writing paper shipped from Adams to Philadelphia is unreasonable, prejudicial and disadvantageous. The commission is asked to order the establishment of a reasonable rate not over 19 cents and to award reparation on account of shipments at the higher rate made during the past two years. The complainant filed a detailed statement showing various shipments made by it, the date of same, complete milling reference charges paid consignee, car numbers, evidence of payment, rates charged and asked, reparation claimed and other similar information.

* * *

The Annual Meeting of the Western Paper Dealers' Association was held on the afternoon and evening of Friday, January 8, at the Grand Pacific Hotel, Chicago, Ill. New officers were elected and routine business transacted. Delegates were also chosen to attend the National Convention in New York on February 15, 16 and 17 next.

* * *

The new four-storey chemical building of the University of Maine, at Orono which is unique among buildings of its kind in that it has a miniature plant devoted to the making of pulp and paper, is practically completed, and will be thrown open to the students shortly. The building is fire-proof as possible to be constructed. The first floor will be devoted chiefly to the pulp and paper making course. The machinery for this has arrived and will be set up at once. A digestor made by the Portland Company is ready for the installation of the boiler and beater. Practically the entire process of pulp and paper making will be carried through when the equipment is complete. Brick and concrete are the chief materials of construction and a notable feature is the number of large windows. The first storey is below ground and is lighted by generously big windows at the level of the ground.

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The Newton Falls Paper Company of this city, through its president and general manager Frank L. Moore, has just purchased a 6,500 acre tract of virgin timber land in the Cranberry Lake section of the Adirondacks which guarantees the company an extended pulp wood supply for about eight years. The company already owns 7,000 acres of virgin forests which have not been touched. The purchase comprises the pulp wood stumpage from the Little River Timber Company owned by New York and Pennsylvania capitalists. The land is located within fifteen miles of the Newton Falls plant, and is convenient of access. Lumbering will be started in the spring, when it is proposed to cut about 20,000 cords of pulp wood. This amount will be cut each year until the supply is exhausted.

* * *

Frank L. Moore, president of the American Paper and Pulp Association and general manager of the Newton Falls Paper Company of Watertown, N. Y., has been compiling figures to substantiate his position that the present rates of workmen's compensation insurance are too high. Recently Mr. Moore sent out inquiries to all the paper companies of the state as to the amount of their pay rolls, liability insurance, premiums past and present, etc. The figures obtained are to be used as arguments for a reduction of rates. The figures show that thirty-six paper making concerns paid $19,927.87 in premiums for insurance liability under the previous law, while in 1914 the same concerns were paying $60,396.89. Word went out a short time ago that a reduction of 20 per cent might be expected in the insurance rate, but the paper manufacturers maintain that even this reduction is not in keeping with the actual risks involved. It is claimed that, owing to the safety appliances required by the new law in safeguarding machinery there will be fewer accidents in 1914 than in former years. It is believed that the rates are about three times higher than necessary.

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Statistics of the Chicago Tribune shows that the paper trade had a falling off in 1914 if compared with the previous year. This falling off, however, was not as great as expected in some quarters, and the total for the year, is after all quite satisfactory considering all the circumstances. The total paper and paper stock business, as reported by wholesalers amount to $58,758,000. For 1913, the figures were $61,850,000. The total printing and publishing business for 1914 was $32,560,000 and $40,700,000 for 1913, showing that this department of commerce was rather hard hit during the year. Paper boxes manufactured for the year amounted to $5,250,000 in 1914, as against $5,700,000 in 1913.

Maine Notes

(Special to Pulp and Paper Magazine.)

Bangor, Me., January 11, 1915.

In Aubert Hall, the new science building at the University of Maine, which is about completed, practically one whole floor of the chemistry section is devoted to the pulp and paper making course, and an equipment is being installed which will permit students in this course to actually engage in practically the entire process of pulp and paper-making.

Under the science department of the University of Maine there was established last year the first complete course in pulp and paper-making ever offered by an American university and the success of the project is indicated by the large enrollment.

Working in conjunction with some of the larger pulp and paper manufacturing concerns the students are able in the summer months to find employment in the mills. where they are able to put their school work into practicable effort in the actual industry.

Through the department of commerce and labor of the State the university is now engaged in arranging for an extension course in pulp and paper-making, which promises to be very valuable. Classes are to be organized among the paper makers and employees of the mills in the paper-making centers of the state, conducted by men from the science department at the University, and lecture courses on the industry will be given. It is expected that this will have a strong tendency to improve the efficiency of the men, and the larger concerns are giving the project their hearty co-operation.

Throughout this State, lumber operators are feeling the need of snow. There has been so little up to the present that very little hauling has been done on the big operations, and scores of men have been discharged, having completed the cutting and yarding. Never have conditions been better in Maine and southern New Brunswick for the preliminary operations in the woods, but the operators have been ready for snow for some time now.

Not only in the "wild land" section is snow needed, but it will increase business activity throughout the State. Thousands of cords of pulpwood, cut by Maine farmers, who find this profitable winter work, are on the woodlots, awaiting for sufficient snow so that it may be hauled to the railroads and shipped to the mill.

One Bangor operator alone has 20,000 cords already cut and ready for shipment. This is going chiefly to the Penobscot Chemical Fibre Co. at Great Works, where the company is building a new sulphite mill in connection with its soda ash plant, and will be used when the new mill is ready in the spring.

The Eastern Manufacturing Co. ,with its large papermaking establishment at South Brewer, has a number of small operators cutting pulp wood, who are temporarily held up on account of the lack of snow.

The annual cut of British Columbia timber is approximately two billion feet. There are 420 mills and 790 logging camps in the province, employing about 60,000 men.

The products of the forest are used more closely in New York than in any other state. The Adirondacks are very similar to the famous Black Forest of Germany, both in topography and general forest conditions and in the not distant future will produce equally as valuable forest crops.

BRITISH TRADE NEWS

SPECIAL TO PULP & PAPER MAGAZINE

At the beginning of a new year one always becomes retrospective and naturally in mill matters the past twelve months are scrutinised very probably for a way out to effect a saving on machinery or buildings. In the handling of these subjects one naturally thinks of fires, and for the Canadian mill owner in looking round for examples and samples, he could not do better than turn his attention to some of the British concerns. Fire, or prevention of fire, is a subject which is not considered as it ought to be. In every modern mill and works there should be a brigade of fire-fighters. The brigade can be equipped at a small cost; but the principal feature to be observed after the equipment is completed is the regular drill and false alarms to test the efficiency of the firemen. A good fire brigade will save a mill owner hundreds and thousands of dollars in five years' time. And not only will the brigade be useful in the mill during an accident or, rendering first aid, but it is useful in preventing adjoining property from becoming enveloped in a fire. An instance of this is to be found in Scotland where a fire broke out in a large dwelling—one of the old historic mansions in Stirlingshire—and the first band of fire-fighters on the scene emanated from the adjoining paper mill. They did no end of useful work and have been publicly thanked. Another instan ce occurred recently in London. Messrs. R. T. Tanner and Co., wholesale stationers, had a fire on their premises and one of the first batch of fire-fighters to give a helping hand was the excellent brigade which Messrs. Edward Lloyd Ltd., have trained.

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There is a good deal of discussion going on in London over the prices of newsprint. The paper makers and the owners o fnewspapers are mixed up in it. Naturally, the papermaker is out for top price if he can manage to secure it. But the buyer in war-time wants everything at the minimum. One newspaper owner has written [illegible] "I hold the opinion very strongly that while inability to secure supplies of raw material would justify the suspension of a contract, a mere advance in the price cannot do so. The makers do not give us the benefit of any reduction in the price of raw materials, which may occur during a contract; neither can they compel us to bear an increase should one occur. Nevertheless some have certainly done so, while I know of at least one firm which did not attempt to do so. I hope to hear of more." Then this newspaper friend goes on: [illegible] "My contract for 1914 was at 1¼d (2½ cents) per lb. less 13¾ per cent discount. After the war broke out, I got one supply at that price, the makers said it was stock, or made from raw material in stock. Since then the price has varied as follows: 1¼d (2½ cents) nett, 1¼d less 7½ per cent; 1¼d less 5½ per cent, the latter being the price now quoted to December 31. Whatever may have been the case in August, so far as one can judge from the paper makers, there is now a glut of raw material, but even if it is costing, say, 10 per cent more than in July, surely this ought to be borne by the makers who contracted with us to supply us throughout 1914 with paper at 1¼d less 13¾ per cent?"

The papermakers' point of view is given by another newspaper owner who has sent to his trade journal the following explanation: "I have met with the point of view of the mill-owners. They justify their attitude that the conditions are still not normal, by stating that they bought heavily of raw materials (in the interests of their customers as much as their own) in the panic days to which we revert (without any great satisfaction), when their raw material was at a fancy price, and they have now to keep prices up until those stocks are exhausted, or lose money. There seems to be no doubt that a paper-maker starting operations today without stock would be able to sell paper to newspaper proprietors at as low, or very nearly as low, a price as that which prevailed in July. Where contracts contained a drastic war clause declaring the contract null and void in the event of war, there is ,of course, no grievance. But this was not universally the case, and whatever equity might have conceded to the papermaker in August, the buyer is surely now entitled to the benefit of his contract prices, for pulp is plentiful and cheap and the makers' representatives are simply tumbling over themselves for orders."

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At the present time newsprint paper, white printing and writing papers are easily procurable, as before, at an advance of 5 per cent. Cheap tinted papers, which were almost entirely German, are now procurable at English mills, but are some 19½ per cent higher in prices. Wrappings and bag makers' papers are nearly as plentiful as before. Common browns have advanced about 12 cents per cwt. The British paper industry has now entered upon an eventful year. Buyers get all the paper they require and in some cases the mill-owners are refusing orders for cheap productions. The policy of the British paper-maker in the past has been one of sticking to the production of good grade papers and demanding a fair price.

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Some interesting facts were heard the other day in the London Bankruptcy Court when Mr. George Oliver Hancock and Henry Joseph Burholt, trading as Hancock, Burholt & Co., were examined. In May, 1912, they commenced to import strawboards from Holland, but that branch of the business proved to be unprofitable. The turnover amounted to £20,000 per year and necessitated a capital of £10,000 instead of £500, although they sold for cash and obtained goods on credit. The strawboard business was really a speculation, and immediately after it was started they saw it was beyond their capital, so they proposed to sell it to a company. Accordingly in March 1914, a prospectus was issued of the G. O. Hancock Strawboard and Paper Co., Ltd., but the subscriptions were insufficient, and they did not go to allotment. The failure was attributable to strikes at the works in 1911-12.

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The death has occurred of Mr. Gilbert Johnston Wildridge of the firm of Messrs. Craig and Sons, Ltd., well known paper mill owners at Airdrie, Scotland. Mr. Wildridge was a great authority on the production of paper, and Scotland loses a highly respected employer.

There is a remarkable awakening on the part of the members of the British Paper Makers' Association of Great Britain and Ireland, and everything augurs well for the future. Heretofore, there was always a deep silence, and very few people outside its ranks were made aware of what was being done in the interests of the paper industry. Even the reporters were left in a quandry. Now, a business-like attitude has been adopted and we may thank the Secretary and the war for the new light that is being thrown on the darkness. Of course, the success of any undertaking and any Association largely depends on the energies of the Secretary and where Mr. Alfred W. Foster, B.A., fails no man will succeed. He has a ready pen, is a good speaker, a lawyer, and an up-to-date business man. What more could anybody want! The question of insurance is always a big item in a paper mill and it takes a good man to handle it properly. Fortunately for the British mill owners, Mr. Foster has given the matter some attention and on this occasion he has taken up the liability of employers under the Workmen's Compensation Act, the law in England being that if an employee is injured while discharging his duty in the mill he is entitled to compensation, be what it may. Mr. Foster first collected from the mills statistics as to wages paid, and the claims under the Act paid. These showed that claims just over 2.40 per cent of the wages had been settled. Allowing 40 per cent for commissions and working expenses, this suggested that a rate of $4 per cent would just clear expenses and on this basis he negotiated with the British Dominion's General Insurance Co., in London, who agreed to quote $4.44 per cent on policies that would be taken out through the medium of the Paper Makers' Association and to share profits with the Association, after deduction of 40 per cent for working expenses. Now what has been the result? The members have had a material saving in tariffs and the Association funds, by means of commission, have gained to the extent of within a dollar of $384. The Secretary has also been thanked and awarded $48 for his energetic act.

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An interesting case to pulp men has been heard in the High Courts, in London, in which Dixon & Son, of Oughtibridge paper mill and Grimsby paper mill, and Henderson, Craig & Co., Ltd., pulp importers, were the parties. Some months ago reference was made to the litigation in the Pulp and Paper Magazine, and it will be remembered that the claim is for damages for breach of contract. Dixon & Son entered into a contract with Henderson, Craig & Co., in 1911 for the purchase of 30,000 tons of 1st quality hot ground pulp, the percentage of moisture not to exceed 50 per cent, and the price $10.92 c.i.f. Grimsby. In case of dispute as to quality the matter was to be referred to an agreed analyst, under the rules of the British and Scandinavian Wood Pulp Associations. In 1913 a consignment was sent amounting to 1,137 tons and Dixons refused it on the ground that it had too much moisture. The pulp was analysed and it was found that it contained an excess of 8.09 per cent of moisture, representing about 91 tons 19 cwts. 2 quarters. The Arbitrator awarded £227 8s, including demurrage. Dixon's were now claiming £191 17s money overpaid and the fees of the analyst £10 5s 3d. Henderson, Craig & Co., Ltd. contended that in addition to their clients being out of time, they had wrongfully rejected the pulp. The most important point was the "out of time" question. The contract provided that the claim in respect of rejection must be lodged within 14 days from the date of delivery at Dixon's mills. Dixon's had mills at Grimsby and Sheffield and had a perfect right to take the pulp to any mill they liked, and the time did not run out until the pulp was delivered at a mill. Mr. Joseph Dixon, managing director of the mills, said that when the pulp was tested no representative was present from Henderson, Craig & Co. He would have liked one to be present. Messrs. Henderson, Craig & Co.'s case was that Dixon's should not have entered court on the contract, which was c.i.f. Grimsby. The power of the buyer was also limited and delivery really meant when the pulp arrived in dock. If this view was not taken a buyer would have it in his power to postpone a period of delivery indefinitely. The delivery clause should be interpreted reasonaly. Mr. Fred Becker (Messrs. Becker & Co., Ltd.) thought the lapse of time was accountable for the moisture. The Court gave judgment for £201 2s 3d in favor of Dixon & Son. Notice of appeal has been given.

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The Board of Trade have taken up the question of dyes and colors in an earnest manner. They have entered into consultation with the principal firms with a view to the elaboration of a scheme for the establishment of an undertaking for the production of synthetic dyes and colors. It is believed that the capital will be forthcoming, and the Treasury is prepared within certain limits and subject to certain conditions, to afford financial support to a scheme which will be permanently under British control. The Paper Makers' Association is also considering the dye question, as makers of sugar papers were feeling their position keenly. Foreign papers are also coming into England dyed with German dyes and the Association is in communication with government with a view to having the importation stopped.

TRADE INQUIRIES.

The Department of Trade and Commerce, Ottawa, announces the following trade inquiries. On quoting the number to the Department, any firm interested can receive names and addresses of inquirers.

82. **Oil Paper.**—A Paris house wishes to get in touch with manufacturers of oil paper and receive catalogues and prices.

86. **Metallic paper for confectionery and perfumery trade.**—A manufacturers' agent in Paris desires to receive quotations from manufacturers of metallic paper used by confectioners and perfume manufacturers.

94. **Cardboard.**—A British firm desires to purchase Canadian made cardboard of qualities similar to samples to be seen at the Department of Trade and Commerce, Ottawa, and hitherto obtained from Germany and Norway. From 500 to 11,000 tons would be required per annum if suitable arrangements can be made.

111. **Pulpwood pit prop ends.**—A Sheffield correspondent asks for quotations for 1,200,000 pulpwood pit prop ends, 2½ feet long by 5 inches, for delivery next spring, and each subsequent season.

In the United States the federal government, twenty of the States, and thirty timber owners' associations maintain a system of patrol and take other preventive measures on their lands during danger seasons of the year.

The timber industry represents 37 per cent of the annual production of wealth in British Columbia.

THE MANUFACTURE OF INSULATING PAPER

For many years efforts have been made to replace by pulp and paper many materials which in various ways serve a special purpose, and very good results have been attained. In the field of electricity, for instance, mica and other nonconducting substances were used for insulating material. We now find insulating paper most used for this purpose as it fills the requirements and is cheaper than other materials. The insulation must not only be made up of a nonconducting substance but must also be free from substances that even in small amounts are conductors of electricity or are capable of becoming so under certain conditions.

Every plant fiber in the form of paper or press board has the property, when dry, of insulating. On this account one need not be very particular in the choice of raw material for this purpose, but must take great care that the pulp is so well prepared that a sheet can be easily made which is well closed, hard and equally thick at all points. It is these properties which are increased by careful beating, operation of the machine, pressing, finishing, etc., more than by the choice of raw material, though some materials are much more easily worked up than others.

A good, reasonably cheap, satisfactory insulating paper can be made, according to Pappen und Holzstoff Zeitung, 44, 1914, quoted by "Paper" December 30th, in which these observations appear, of raw material comprising as much as 75 per cent old paper. The rest may be jute, spinning waste or even cheap rags. Paper shavings containing wood or free from wood are applicable. In regard to the working of old paper it should be noted that this must be done cold. Hard material is first softened cold and may be treated in the kollergang or be shredded. The latter is recommended here because the fibers are less injured and are well separated, while in the kollergang, unless great care is taken, the stuff is ground too short, i. e., beaten "dead." If softened or beaten warm the old paper loses "rattle" and "handle," losing in this way too much sizing, hydrated fibers (slow stuff), and a certain amount of fiber, the product showing a lack of "handle" and a very poor "rattle."

Jute, bast fibers, or rags are prepared by beating the uncooked stuff to halfstuff in a breaker. This is beaten in the beater to whole stuff and the old paper mixed in at the same time. The materials are well mixed together for twenty or thirty minutes, then beaten as long again with the roll lowered. This time can be shortened or lengthened according to the size and capacity of the beater and the kind of bars and bed plate. It is always essential that the stuff have a good greasy feel, thus assuring a well closed dense sheet. To get this result the beater is furnished fairly thick and the roll and bed plate should have broad, dull bars. The roll must be heavy so as to get the stuff more greasy. All addition of material must be avoided, sizing may even be omitted, as with a good greasy pulp and proper formation of the sheet the paper will be sufficiently sized without it. For a specially sized board product a little resin would help.

Color can be added as desired, usually a bright to a dark brown, as in leather board. Suitable aniline colors are used for this purpose. The addition of earths must be avoided because all materials are more or less hygroscopic and some eagerly absorb moisture from the air or other water directly. Water and moist substances are fairly good conductors of electricity and would make the paper or board unfit for insulating purposes.

On the board machine care should be taken that on a single cylinder machine the removal of water occurs mostly at the forming roll, because here in its formation the sheet is repeatedly pressed and so made dense and well closed. An important rule for this machine is that the stuff in the cylinder vat be kept thin so that the felt takes off thin layers and the cylinder always takes up a very uniform and thin layer of stuff. In order to keep the concentration in the vat constant, the agitator should be at the bottom and should be kept in perfect condition. There should be no unnecessary agitation, or the stuff will be sent first to one side and then to the other, making much of the board of unequal thickness.

In order that the thin layer of stuff on the cylinder be not too much dewatered by the felt, it is necessary in the manufacture of insulating board that the couch roll rest rather high on the crown of the cylinder. The felt must be thick and at the same time permeable so that the sheet reaches the couch roll with the necessary amount of moisture. If layers are too dry they will not press together but the board will split when dry.

The couch roll is heavily weighted and of metal. Wood rolls are obsolete, produce much waste, and give a board of unequal thickness with knot and crack mark.

Between press plates of metal in a hydraulic or other powerful press the board is further dewatered by strong pressing. Small packs are used as otherwise the pressure is too elastic and weak. The pressing must be carefully done, as a sheet otherwise satisfactory may be spoiled in this operation. The press smooths out slight unevenness in the thickness, makes the sheet firm and dense, gives it a glaze, and assists in the drying.

Because each sheet must have a uniform thickness, and one sheet be as thick as another, it is recommended that such a thickness indicator as the recently-invented Schopper-Metaschk apparatus be used. This instrument works continuously and measures to 1-100 millimeter.

The complete drying of the board is best accomplished in passages. These provide a very uniform drying, and with the least injury to the goods, the least waviness, and with no waste formed.

After subsequent dampening in a closed humidifier, the board can be glazed with further treatment, for each sheet is finished with a very high glaze.

Chemists of the E. B. Eddy Company who have been conducting various experiments since the war began with a view to finding substitutes for certain chemicals the supply of which from Germany has been cut off by the war, have as yet met no definite success according to Mr. Millen. However, he states, there is still hope that substitutes can be obtained in Canada. Meanwhile the company has a sufficiently large stock of the materials in question to carry it along for a number of months yet.

PULP AND PAPER NEWS

Fred Lancaster, of Halifax, Maritime Province representative of the Canada Paper Co., of Windsor Mills, Que., spent a few days in Montreal recently on business.

* * *

J. B. Morrow, managing director of the National Paper Co., Valleyfield, Que., spent a few days in Toronto last week with E. G. R. Clarke, Ontario representative of the company.

* * *

Mr. Pendock, representative of the Howard Smith Paper Mills in Montreal, and more recently in Ottawa, died in the latter city a few days ago from an attack of Bright's disease. He had many friends in the trade.

* * *

J. B. Beveridge, General Manager of the Dryden Timber and and Power Co., Limited, Dryden, Ont., was a candidate for the mayoralty of Dryden at the recent election, but was defeated by the small majority of thirty votes.

* * *

Hon. G. Howard Ferguson, of Grenville, who was recently appointed Minister of Lands, Forests and Mines, for the Province of Ontario, has now definitely entered upon his new duties, being returned by acclamation by his constituents.

* * *

W. S. Boyd, formerly with Price Bros. and Co., Jonquiere, has been appointed sales representative of the new new news print mill of the Brompton Pulp and Paper Co. at East Angus, Que., which is now in operation and turning out about fifty-five tons per day.

* * *

W. P. Gundy, who is widely known to the paper trade, has been elected President of the Ontario Unemployed Commission, which was recently appointed by the Ontario Government to inquire into the cause of unemployment, and to make recommendations to the end of ensuring a decent living for every man and woman who is willing to work.

* * *

A. G. Campion, sales manager of the Belgo-Canadian Pulp and Paper Co., Shawinigan Falls, Que., was in Toronto last week on business, and reports that good progress is being made with the installation of the new paper machine which the company is adding and which will be in operation in a few weeks' time. The new sulphite plant of the company has just been completed.

* * *

The output of lumber in 1914 in British Columbia was 612,000,000 feet as compared with 858,000,000 feet in 1913, which was the record cut. The situation, however, shows signs of improvement and lately several new charters have been granted to companies. During the last two months there has been a large export of cedar logs to the United States which was heretofore prohibited. No less than 25,000,000 feet have been sent out during the last few weeks to several American ports.

* * *

The Beck Manufacturing Co., Limited, has been granted a provincial charter, with a capital of $400,000 and head offices in London, Ont. The company, which is composed of Sir Adam Beck, William Kingston, Lady Beck, and others, is granted wide powers in the matter of dealing in timber, logs, lumber and wood of all kinds and is empowered to take over and acquire the several business in this line now carried on in various cities of the Dominion by Sir Adam Beck and the Beck Manufacturing Company.

* * *

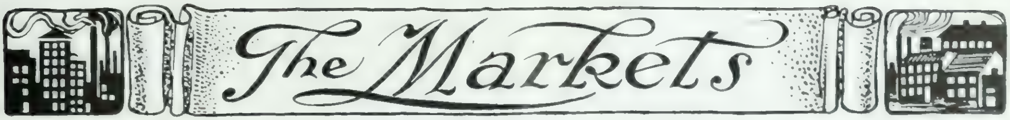
At the annual meeting of the Ratcliff Paper Co., Limited, held in Toronto on January 9, the reports showed that the business done during the past year had been very satisfactory and an increase was reported in several departments. The company, which has been sixteen years in existence, is looking forward with confidence to the coming year. The following officers were elected: President, F. L. Ratcliff; Vice-President, T. E. Gain; Secretary N. J. Ratcliff. The travellers and members of the staff were entertained by the President a few days ago, and a very pleasant time was spent.

* * *

C. Nelson Gain, who for the past three years has been chemist and assistant superintendent of the Kinleith Paper Mills, St. Catharines, has been appointed superintendent of the Don Valley Paper Mills, Toronto, succeeding J. J. O'Connor, who has resigned. Mr. Gain, who entered upon his new duties this week, is a son of Thomas Gain, the veteran paper salesman and has had an experience of several years, being with the American Writing Paper Co. at Windsor Locks, Conn., for four years, and with the Walloomsac Paper Co., at Walloomsac, N.Y., as chemist for about three years and since then with the Kinleith Paper Co., St. Catharines. He is a brother of T. E. Gain, Vice-President of the Ratcliff Paper Co., Toronto, and J. H. Gain, paper goods dealer, 124 Richmond Street West, Toronto.

* * *

It is expected that a hundred thousand cords of pulp wood will be taken out of Northern Ontario this winter by the settlers, the weather conditions being favorable. Several rossing plants have been established along the line of the Timiskaming and Northern Ontario Railway and the settlers are taking their wood to these to have the bark taken off. In some cases the settlers sell the wood direct to the rossing plants and thus has it ready for the mill clean and free from stain, while in other cases they pay for the operation and in turn sell to the mills. J. L. Englehart, Chairman of the Timiskaming and Northern Ontario Railway Commission, has just returned from an extended tour of the North, and says there is apparently no hardship from lack of unemployment and pulp wood shipments along the line of the railway will be extensive, large consignments being sent to Sturgeon Falls, Espanola, Iroquois Falls, Thorold and other consuming centres.



The Markets

CANADIAN MARKETS

The market conditions in the pulp and paper trade generally do not make very exciting reading during the month of January when quietness in all lines is looked for after the holiday rush. Things do not pick up until toward the end of February and until after the mills and warehouses have completed their inventories and annual meetings have been held, accounts closed, etc. Meanwhile, all firms are now putting their houses in order and wondering how trade will develop with the advent of spring.

News print mills are still active and some contracts are being renewed with Canadian papers at an advance of five to seven cents a hundred. Returns show that the quantities of news shipped abroad are constantly increasing. The October export of news print was valued at $1,405,431, bringing the seven months' export of the current fiscal year for the Dominion to a total of $7,974,630. Eight months of 1913 showed a total export of $6,918,177 and eight months of 1912 $3,110,458, so that the amount has more than doubled in the last two years, revealing the great strides being made by the industry in this country. The majority of the shipments now go across the border, October exports to the United States being $1,194,877. New Zealand came second, taking $109,306, England $29,909, Australia $17,260, and other countries combined $54,079. Exports of mechanical and chemical pulp also reached record figures during the past seven months.

It is expected that before the close of the present year, the daily tonnage of news print made in Canada will be over 2,000 a day. The big mill of the Abitibi Power and Paper Co. will bring an additional 225 tons on the market, while additions to the plants of the Laurentide, Belgo-Canadian and other concerns will contribute over a hundred tons more. The new plant of the Brompton Pulp and Paper Co. at East Angus, Que., is now in operation, and on the whole the outlook in news print is bright and encouraging.

In the book and writing paper line, mills are rather quiet at present, and since the outbreak of the war most plants have been operating only four and five days a week and at rather slow speed. It is estimated that, while conditions are as good as can reasonably be expected in view of the commercial depression, the falling off in tonnage is about twenty per cent during the past few months.

While all prices were withdrawn at the commencement of hostilities in order that the companies might protect themselves in case of abnormal raises in raw materials, it is not expected that any increase will be put into effect owing to market conditions and principally because sulphite has not taken any material jump. The contracts which have expired are now being renewed on practically the same basis as last year with a slight increase in some cases, but the advance is so small that the difference is being taken care of by the book and writing mills without any exactions from customers. The reason that sulphite is easier in price is due to larger foreign supplies than anticipated, and also that there has come, or will come on the market, some more domestic sulphite. Owing to the very insistent demands of the Scandinavian banks that the pulp producers get more ready money, and to the fear among these producers that the war would prevent their shipping continuously, a good deal of sulphite was hurried across to America. There is the fact, further, that American and to a certain extent, Canadian writing and book mills have not been ordering up to normal.

Unbleached sulphite is also easier in price, and new sources of Canadian supplies will be available. Ground wood is holding its own very well and prices keep up much better than sulphite. The tonnage in this respect is about the same as last year, and is abundant to meet present demands. In the wrapping paper line things are quiet and mills are anxious for business, but jobbers are buying cautiously and are not disposed to load up in view of the uncertain state of trade, while consumers are purchasing in limited lots and using up all available paper on hand. Some mills have reduced prices ten per cent in carload lots to jobbers. Kraft is in pretty good demand owing to the shutting off of foreign importations.

An interesting announcement will shortly be made to the Canadian trade in the production of grease proof, glassine and other papers which were imported entirely before the war. These will now be made in the Dominion. Certain experiments, which have been conducted, have turned out better than expected and the new lines will be ready for the local market in a few weeks.

In the rag and paper stock arena, conditions are quiet, as the mills have not yet started running at full time after the holiday quietness. Prices remain about the same, and lower in some grades. Mixed papers are hardly moving and folded news, cardboard and mixed shavings cannot be sold. They have to be included in mixed papers to get rid of them at present. White blanks, No. 1 book stock and other lines have taken a decided drop in figure—about ten cents per hundred. The situation is not expected to change for some time:—

Quotations, f.o.b. Toronto, are:—

Paper.

News (rolls), $1.95 to $2.05 at mill, in carload lots.
News (sheets), $2.10 to $2.15 at mill, in carload lots.
News (sheet), $2.20 up, depending on quantity.
Book papers (carload), No. 3, 3.75c. to 4.25c.
Book papers (ton lots), No. 3, 4c. to 5.50c.
Book papers (carload), No. 2, 4.25c.
Book papers (ton lots), No. 2, 4.50c. to 5.25c.
Book papers (carload) No. 1, $4.75 to $5.25.
Book papers (ton lots), No. 1, 5.25c. to 6.00c.
Writings, 4½c. up.
Sulphite bond, 6½c. to 7½c.
Grey Browns, $2.35 to $2.75.
Fibre, $3.25 to $4.00.
Manila, B., $2.85 to $3.25.
Manila, No. 2, $3.10 to $3.50.
Manila, No. 1, $3.35 to $4.00.
Unglazed Kraft, $3.90 to $4.50.
Glazed Kraft, $4.25 to $5.00.

Pulp.

Ground wood pulp (at mill), $17.00 to $18.00.
Ground wood, $22 to $24, delivered.
Sulphite (unbleached), $40 to $44, del. in Canada.
Sulphite (unbleached), $40 to $45, delivered in U.S.
Sulphite (bleached), $55 to $58.
Sulphite (bleached), $55 up.

Paper Stock.

No. 1 hard shavings, $2.00.
No. 1 soft white shavings, $1.80.
No. 1 mixed shavings, 50c.
White blanks, 90c.
Heavy ledger stock, $1.50.
Ordinary ledger stock, $1.25.
No. 2 book stock, 50c.
No. 1 book stock, 80c.
No. 1 Manila envelope cuttings, $1.20.
No. 1 print Manilas, 65c.
Folded news, 30c.
Over issues, 35c.
No. 1 cleaned mixed paper, 25c.
Old white cotton, $2.50 to $2.75.
No. 1 white shirt cuttings, $5.75 to $6.00.
Black overall cuttings, $1.70.
Thirds, blues, $1.50.
Black linings, $1.75.
New light flannelettes, $5.00.
Ordinary satinets, $1.00.
Flock, $1.10.
Tailor rags, 90c.
Manila rope, 2¾c to 3c.
No. 1 burlap bagging, 90c.

Quotations f.o.b. Montreal are:—

Book—News—Writing and Posters.

Roll News, $40 to $43 per ton for large orders; $45 to $50 per ton for small orders.
Ream News, $45 to $47 per ton for large orders; $50 to $60 per ton for small orders.
Cover Paper 5½c. to 7c.
No. 1 Book, 5¼c to 6c per lb.
No. 2 Book, S.C., $4.50 to $4.75 in large quantities; $4.75 to $5.50 in small quantities.
No. 3 Book, M.F., $4.00 to $4.25 in large quantities; $4.40 to $4.50 in small quantities.
Writings, 5c to 7½c.
Sulphite Bond, 6½c to 8½c.
Writing Manila 5c.
Colored Posters 4c. to 5c. per lb.

Wrappings.

Grey Brown, per 100 lbs., car lots, $2.25 net; 5 tons $2.45; 2 tons, $2.55; 1 ton, $2.65; less, $2.75.
Red Brown, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, 3.15; less, $3.25.
B. Manila, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, $3.15; less, $3.25.
No. 2 Manila, car lots, $3.10; 5 tons, $3.20; 2 tons $3.30; 1 ton, $3.40; less, $3.50.
No. 1 Manila, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton, $3.65; less $3.75
Kraft, $3.75 to $5.00.
Fibre, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton $3.65; less $3.75.
Fibre, $2.75 to $3.50.
Manila, B., $2.50 to $3.25.

On large orders to the jobbing trade some manufacturers are quoting 10 per cent off the above prices on wrapping.

Pulp.

Sulphite easy bleaching, $43 to $45 per ton.
News quality, $41 to $42 per ton.
Bleached sulphite, $54 to $59 per ton.
Kraft pulp, $3.60 to $4.00.
Ground wood, No. 2, $22 to $24, delivered United States.
Ground wood, No. 1, $15 to $16.

NEW YORK MARKETS

(Special to Pulp and Paper Magazine.)

January 13, 1915.

The interval saw little change in the general situation in ground wood pulp, which moved along normally for this time of the year. Most of the manufacturers are very hopeful of the new year and are confident of a good demand as cold weather continues, and the power supplies are hampered by freezing. Prices remained firm and reflected a sharp upward tendency. A number of mills having contracts which expire this month or early in February are beginning to make inquiries for deals to cover themselves during the spring.

There has been a weakening in the sulphite market during the last few weeks. A number of contracts were closed at pretty low prices, in some cases lower than the values of a year ago. There is an unusually large supply of pulp of all kinds at some of the domestic ports. Easy bleaching has been offered on contract at 2.10, but there is a poor demand for this grade. Strong unbleached has been offered at 1.90 and in some cases even lower. Bleached sulphite is in poor demand, and is very weak in price, values ranging according to grade from 2.75c to 2.90c a pound ex-dock port of arrival. It was reported that mills abroad are strengthening their prices and are holding firm to the last figures named by them. Paper mills are inclined to withhold from making any contracts unless shipments can be guaranteed, as they can buy all supplies for their immediate needs on spot. Importers can give no guarantee of delivery as long as the war lasts.

Imports of rags and bagging have fallen off considerably, and it is generally believed that the last arrivals until spring have been entered. Prices are stiffening a little in all grades. Domestic collections are falling off as the winter progresses and, as a result, supplies are becoming scarce. Dealers are very optimistic about the future, and are holding the supplies they have in store for higher prices.

The market for all grades of old waste papers has been rather dull in the interval as mills were busy at the turn of the year, taking inventory, and were making only light purchases. There has been a great deal of competition among the packers for the waste of the binderies about the city. The only grades that have been moving during the last few weeks are shavings and flat stock. Soft whites have been quoted at 1.80c to 1.90c a pound and hard whites have moved at 2.40c to 2.50c. Stitchless magazines have moved freely at an advance of about a dollar a ton, the present value being 90c to 95c a hundredweight. Old Manilas and newspapers have been in poor demand, and have been weakening in price. Mixed papers have been in an almost demoralized state.

Pulps.

Ground Wood, No. 1, $20 to $25.50, delivered.
Ground Wood, No. 2, $17.50 to $20, delivered.
Unbleached Sulphite, dom., 2⅛ to 2½, delivered.
Unbleached Sulphite, imptd., 1.90c to 2.10c, ex dock, New York.
Bleached Sulphite, domestic, 3.35c, delivered.
Bleached Sulphite, impt., 2.80c to 2.90c, ex dock, N.Y.
Easy Bleaching, impt., 2.10c to 2.20c, ex dock, N.Y.
Unbleached sulphate, impt., 2.00c to 2.15c, ex dock N.Y.
Bleached sulphate, impt., 2.80c to 3.00c, ex dock, N.Y.
Kraft Pulp, 1.95c to 2.15c, ex dock, New York.

The turn of the year found rather unexepected conditions in the jobbing trade. After the taking of inventory, many of the jobbers handling fine papers were surprised to find that the stocks they had on hand were unusually low. They had moved a large tonnage of their stocks in small lots, and did not allow for a deterioration of their wareroom supplies. As a result, the first week of the new year found an active demand for these grades of paper. Prices were firm in all cases and have a hardening tendency. While the stocks of wrapping and book papers were sub-normal they were not unusual for this season of the year. Bags and specialties were found aplenty. Practically all contracts for newsprint have been closed, and it was reported that a general average advance of fifty cents a ton had been realized on this year's business. The past two weeks have brought about an active demand for rolls on contract as well as in transient. This demand was attributed to the advertising of the large automobile manufacturers now exhibiting their cars in this city, and also to the big advertisements of the department stores offering special sales of their stocks left over from last year. The demand for sheets has been heavy, and the price has stiffened considerably. Owing to the very weak market for side runs at present, most mills are not making any. The condition of the book market has been disappointing, as a number of publications have taken only a small share of their normal supply. One publisher using 800 tons a month, took only 300 during the month of December. Prices are fairly well maintained as manufacturers say that they cannot afford to sell at any lower price than at present. Wrapping paper mills have been running on part time, as there has been a very poor demand for all grades, and jobbers have pretty large stocks at present. The tissue situation has undergone no change in the interval, prices remaining weak under a poor demand. Boards have been quiet and weak in all descriptions. Bags were quiet, but prices were fairly firm.

Paper.

Quotations unchanged for all grades of paper:—

News, rolls, transient business, $1.95 to $2.05 f.o.b.
News, rolls, contract renewals, $2.00, f.o.b.
News, side runs, 2.25 f.o.b. New York.
News, sheets, 2.30 f.o.b. New York.
News, sheets, 2.35, f.o.b. New York.
Book papers, car lots, M. F. S., $3.75 to $4.90 f.o.b.
Writing paper, superfine, 13½c to 17c, del. east of Miss. River.
Writing paper, extra fine, 11c del. east Miss. R.
Writing paper, No. 1, fine, 9c, del. east Miss. River.
Writing paper, No. 2, fine, 8c del. east Miss. River.
Writing paper, engine sized, 4½c to 8c, east Miss. R.
Bond paper, 5c to 24c, delivered east of Miss. R.
Ledger paper, 8c to 30c, delivered east of Miss. River.
Linen paper, 7c to 18c, delivered east of Miss. River.
Manila jute, 5¼c to 5½c, delivered.
Manila, wood, 2.65c to 3.25c, delivered.
Kraft, No. 1, $3.65 to $4.00 f.o.b. New York.
Kraft, No. 2, $3.35 to $3.60 f.o.b. New York.
Boxboards, news, $27 per ton, delivered.
Wood pulp board, $40 per ton, delivered.
Boxboards, straw, $23 per ton, delivered.
Boxboard, chip, $25 per ton, delivered.
Tissue, fourdrinier, 50c f.o.b. New York.
Tissue, white, cylinder, 45c to 47½c f.o.b. New York.

THE BRITISH MARKETS.

Special to Pulp and Paper Magazine.

London, December 31, 1914.

Owing to the Christmas and New Year holidays, business in London and Manchester in the pulp trade is dull and very little passing. Only prompt parcels are handled and it will take another week or two to revive market conditions, which usually prevail about this time of year.

* * *

There is a fair amount of trade stirring in paper and the consuming channels show a little briskness. Before the Christmas holidays trade is usually bright, and then falls into a dull state. There is, however, not such a great dullness now prevailing when compared with the same period in 1913. Contracts are usually signed and paper-makers are holding out for top quotations.

CLEAN WORKING OF PULP VATS.

Direktor Paul Eblinghaus, of Copenhagen, has pointed out that horizontal pulp vats allow of layers of pulp to settle on the vertical portions of the wall surface. These layers dry up, and through crumbling present constant risk of staining the product or the pulp produced. It is, moreover, impossible to remove the layers of pulp within the short time of changing color.

Herr Eblinghaus allows the horizontal vats to be inwardly vaulted with a lid in two or three parts, and the brushes for cleaning to be screwed the whole length of the vats. At the longitudinal and transverse sides of the vats, water is provided by spray pipes, the unscrewing of the various brushes being easily effected and the whole operation of cleaning being completed in half an hour. It formerly took several workers many unsuccessful attempts to clean the vats. Claims and deductions were then frequent for the delivery of the paper in stained condition.

Several Old Country paper firms, which have been in the habit of sending travellers to Canada immediately after the Christmas holidays, have decided not to do so this year, owing to the condition of business brought about by the war and, in the meantime, are asking that any orders be forwarded by mail. It is expected that the usual visits of English and Scotch mill representatives will, however, be paid early in the spring.

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Forest Conservation

"Forest Fires are and still will be for some years the great enemy of the forest in Canada. The danger to our timber supplies from this great destructive force has been iterated and reiterated until those who have heard it from year to year begin sometimes to wonder if we must always harp on the same string. But we are forced to play the one note till the country has learned it, and their returning vibrations do not as yet indicate any great or general degree of harmony on the subject."

The above is one of the more direct and striking statements made at the meetings of the Commission of Conservation held in Ottawa on January 19th and 20th. The speaker was Mr. R. H. Campbell, Director of the Dominion Forestry Branch.

It is in a measure disheartening—that "their returning vibrations do not as yet indicate any great or general degree of harmony on the subject." Canada's forests have not as yet the united nation as a guardian. Forest fires are burning and will go on burning for many decades if public opinion does no more than at present to stop them.

The Pulp and Paper Magazine has made a special effort to secure for this issue the addresses delivered before the Commission of Conservation in the annual meeting held last month. Officials of the Commission have kindly loaned original copies for the purpose of allowing this periodical to place before its readers the results of a year's investigations by the leading forestry experts of the Dominion. To the manufacturers of pulp and paper and to lumbermen the question of forest conservation is of a pre-eminent importance. The general public has allowed the issue to remain undecided for generations. Surely in the pulp and paper industry the earnest efforts of our forestry officials and other workers will find a response.

Canada's forests and water-powers are the backbone of pulp and paper manufacturing. This truth, while self-evident, does not seem to have gained the hold that it should have among our people.

Mr. H. R. MacMillan, Chief of the Forest Branch in the Province of British Columbia was courageous enough to tell the people of Canada, through the Commission of Conservation, that they are much less patriotic to refuse to undertake a forestry policy, knowing that from 50 per cent to 85 per cent of the various Provinces of the Dominion are not suitable for agricultural purposes, than to know it and not to admit the fact. He pointed out that there are vast areas right within the borders of our largest communities that have assumed the character of great wastes, and are now looked upon without any thought that they are possible producers of wealth at least the equal of those for which great rushes were made in the West. Mr. MacMillan's remarks fitted in with those of Dr. Fernow, the noted forester and educator, who, as will be seen from the paper which is included in this issue of this magazine showed how the Trent Watershed could be made a property worth millions of dollars rather than a barren waste which, to a large extent, it as present is. The meeting of the Commission of Conservation should do much to stimulate throughout Canada the sense of proprietorship of the Canadian people in the areas which open such immense possibilities along forester lines.

Sir Clifford Sifton in his address dealing with the Forestry problem shows that there is great hope, particularly from the attitude which has been shown by the railroads and other large corporations, in protecting rights-of-way and timber limits. That this problem, however, is far from solution, was shown by the necessity of the resolution of Mr. Ellwood Wilson of the Laurentide Company, who moved in the Canadian Forestry Association that the Association strongly urge the Government to subject the National Transcontinental and Intercolonial Railways to the same rules and regulations as to fire patrol and fire protection as are now imposed on all other roads by the Railway Commission. If our own Government is not willing to place itself in the same category as the Railways which come under the jurisdiction of its own Board, what are we to expect from others on whom responsibility rests less heavily?

Sir Clifford Sifton drew attention also to one of the most glaring anamoly in Canadian industrial development, in that while the Dominion Forestry Branch, the British Columbia Forestry Branch and the Quebec Forest Service all have quite extensive organizations, and have done excellent work, the Ontario Government, which has jurisdiction over our richest and most densely populated provinces, is doing less and has only the beginning of a forestry organization.

To Sir Clifford Sifton, Chairman; Mr. Jas. White, Deputy Head and Mr. Clyde Leavitt, Chief Forester of the Commission of Conservation, must be given immense credit for the work which they have carried out in the course of the year in regard to investigation of Forest Conditions in Canada. The Pulp and Paper Magazine in presenting the papers delivered before the Commission, hopes and trusts that it will be the means of awakening among those who already have a deep interest, and who have done much for the cause of forestry in Canada, a still deeper interest in these matters.

Safety Rules

Safety organization is receiving rapid advancement in the state of Wisconsin. The regulations which have been adopted show that there is a keen appreciation among papermakers and government alike of the peculiar hazards of the industry, and that there is an earnest desire abroad to reduce the loss of life and limb to a minimum. The recent advances which have been made in the realm of hazard reduction indicate that the modern world has been almost criminally negligent of workers. The reason was simply lack of thought. A stimulus is now being introduced in all quarters which should do much to advance the cause of "Safety First."

The regulations of the paper manufacturers of Wisconsin as accepted by the State Industrial Commission are of particular interest. They provide as follows:—

On all machine calenders, except supercalenders, where the paper is taken off the top roll to be fed into the first nip, a feeding belt or other efficient device must be provided to conduct the paper into the first nip and thus make it unnecessary for the operator to use his hands in this dangerous place.

On all paper machines, where drier felts are used, each lower drier must be equipped with an efficient doctor. (Note: It has been found from experience that doctor blades made of well seasoned, straight-grained maple are equally as efficient as those made of iron or bronze, and are cheaper. Wood blades will not cut the driers.)

On all drum winders where the drum and paper rolls run in on the operating side, the point of contact must be guarded.

The winding reels in paper mills used with the paper machine where rolls of paper run in, must be guarded or the reels must be constructed that it is impossible for less space than eight inches between the reels of paper when they reach the maximum size.

(Note.—In order to limit the space between the reels, a permanent stop may be placed below the bottom reel and above the top reel, which will limit the size of the reels.)

All barkers and shippers must be so equipped that the speed is maintained with safe limits.

(Note.—The term "safe limits," as used in the above order, shall mean the maximum safe speed as prescribed by the manufacturer of the machine. The record of accidents on Wisconsin caused by explosions of discs on chippers and barkers reveal the fact that pratically all of them were caused by overspeeding, and would have been prevented by an efficient governor to regulate the speed.—Note B.: All barkers and chippers should be thoroughly inspected and tested at least once each week to detect flaws in discs.)

All rag-sorting tables where operators stand and sort rags and other material which throw off dust, must be equipped with an efficient exhaust system.

All rag-cutting and rag-threshing machines must be located in rooms separate from any room in which other work is being done.

In all paper mills where women and children are employed, adequate working facilities must be provided, including warm water.

What an official of a large company operating several mills in Maine says appears to be true: "The mills are all in first class condition. It will be found that the removal of the tariff on paper will be a serious check to any additions to the newsprint paper mills on this side of the Canadian line, and in general only such alterations will be made as are imperative."

Business conditions have not been the best in Maine during the past year but it is generally admitted in the trade that they have held their own. The slight advance in price has not been equivalent as yet to the advance in the cost of raw material. The conditions, as they exist today, however, are more promising and better prices should be the result, according to one prominent paper manufacturer.

NOTES ON RICHTER'S METHOD FOR DETERMINING BLEACHING QUALITIES OF SULPHITE FIBRES

By E. SUTERMEISTER.

(Written Specially for Pulp and Paper Magazine)

In the Original Communications of the Eighth International Congress of Applied Chemistry there was published a paper by Dr. Erich Richter on "A New Technical Determination of Bleaching Quality of Sulphite Pulp." According to this method 5 grams of the air dry pulp are broken up in thin pieces, put in a wide mouth bottle with 100 cc. of nitric acid (about 13 per cent HNO_3) and after shaking thoroughly, are allowed to stand for about an hour in a dark place. At the end of this time it is again shaken, the pulp filtered off by means of a little absorbent cotton in a dry funnel, and the filtrate set one side in a small bottle. A standard pulp, whose bleaching properties are known, is treated in the same way, and the filtrate from this used for comparison with that from the pulp under investigation. Suitable amounts of each acid solution are placed in Eggertz carbon tubes and compared. After matching the colors of the two tubes, either by diluting the stronger or by adding more of the solution to the weaker, it is easy to figure the bleach required as follows:

Suppose the standard pulp required 8.5 per cent of bleach and that 25cc. of the solution from this gave the same depth of color as 25 cc. from the unknown sample when diluted with 12 cc. of water; then the bleach required by the unknown sample would be

$$\frac{8.5 \times 37}{25} = 12.6 \text{ per cent.}$$

The author's method of determining the bleaching qualities of pulps is to treat a weighed quantity with a definite amount of bleach and when this is entirely used up to wash out the bleach residues, make the pulp into hand-mold sheets, and after air drying, compare them with sheets of a standard bleached pulp also made up on the hand mold. If this first attempt does not give the standard color a second trial is made using more or less bleach as the case may require. This proceedure, while accurate and dependable, is time consuming and laborious, and it is evident that it would be very desirable to adopt a more rapid method, such as Dr. Richter's, provided the results were equally reliable.

The new method was, therefore, tried out on a number of pulps, making the color comparisons in a colorimeter in which the solutions were poured in two carefully matched tubes which were looked at sideways instead of vertically. As the thickness of solution was thus a constant the degree of dilution directly affected the color and the whole operation of matching the standard could be performed with a single sample of the acid from the unknown by diluting it to the proper point and noting the volume of water necessary to accomplish this result.

For preliminary experiments two samples of fibre which had already been bleached to standard color in the old way, i.e., by the hand-mold sheet method, were selected and compared with a fibre which had been bleached with particular care to act as a standard, and which was known to give the desired color with 12.[illegible] per cent of bleach. Two tests were made on each of the samples with the following results:

	Bleach required according to Richter's Method.	Old Method.
1	18.7 per cent and 18.8 per cent	19.2 per cent
2	15.7 per cent and 16.0 per cent	15.1 per cent

The two tests on the same fibre gave fairly good checks, but they were not in such close agreement with the old method as was anticipated. Consequently, further tests were carried out with other samples, using this time as a standard a sulphite which required 11.3 per cent of bleach when tested in the old way. In these tests 5 gms of air dry fibre were treated with 125 cc. of the acid (13 per cent HNO_3), allowed to stand 2½ hours, and then filtered off through a platinum cone. Of this colored acid 25 cc. were diluted with an equal volume of water, and the colors then matched by adding water to the unknown or to the standard, as was necessary. The data and results on eight samples are given in the accompanying table.

Sample No.	Dilute acid used.	Water necessary.	Per cent bleach for Standard Color. Richter's Method.	Old Method.
3	25	1.0	11.8	11.8
4	25	6.0	14.0	14.5
5	25	1.0	11.8	11.5
6	25	4.0*	9.8	9.7
7	25	18.0*	6.5	5.6
8	25	10.0	15.8	16.4
9	25	5.0*	9.4	8.5
10	25	12.0*	7.6	7.5

* In this case the water was added to the standard instead of to the unknown.

In some of these samples the agreement between the two methods of testing is sufficiently close, but in others, notably samples 4 and 7, it leaves much to be desired. Thinking it might possibly be due to difficulty in telling when just enough water had been added to one of the tubes in matching the colors, three samples were tested and very careful observations made during the dilution of the more highly colored acid. This showed that after the tubes were matched as closely as possible it was necessary to add from 2 to 4 cc. more water before a distinct difference was noticeable. In the three samples tested in this way the limits of matching the standard would correspond to differences of 1.3 to 1.8 per cent of bleach, showing that a pulp actually requiring 10 per cent of bleach might easily be reported as requiring 11 to 11.5 per cent.

During these tests it was noticed that if the colored acid from treating the fibre were made alkaline with ammonia, the color was greatly intensified, and slightly shifted toward a red shade. Hoping that possibly these alkaline liquids could be matched with better success than the acid ones, 10 cc. portions of the acid from samples 8, 9, and 10 were taken and added to 10 cc. of ammonia of such strength that the resulting liquid would be slightly alkaline. These solutions were then matched with a similarly treated one from a standard pulp requiring [illegible] per cent of bleach. In this work Nessler tubes were used, and that volume of the unknown noted, which was required to exactly match

5.0 cc. of the solution from the standard pulp. The results and the calculated bleach required are as follows:

			Bleach required.	
Sample	Solutions used.		New	Old
No.	Standard.	Unknown.	Method.	Method.
8	5.0 cc.	3.37 cc.	16.8	16.4
9	5.0 cc.	5.97 cc.	9.5	8.5
10	5.0 cc.	7.30 cc.	7.8	7.5

As this proceedure appeared to give no more accurate results than the acid solutions and showed no superiority in regard to matching the colors, further work along this line was discontinued.

During these experiments on sulphite fibres two samples of sulphate pulp were also tested, using the same standard sulphite for comparison:

Sample	Acid used.	Water necessary.	Richter's Method.	Old Method.
Sulphate No. 1	25	9.8	15.7	24.0
Sulphate No. 2	25	9.0*	8.3	14.4

*Water added to standard.

It would appear from these figures that the sulphate process removes some constituent, which is not taken out by the sulphite process and which, in pulps made by the latter method, causes a coloration of the nitric acid. It is to be concluded, therefore, that the method will not give even approximate results when sulphate fibre is compared with a sulphite standard. Whether it would give better satisfaction if the standard were a sulphate fibre of known bleaching qualities has not been determined, as no tests along this line have been made.

The conclusions which have been reached from this investigation are that the method as proposed by Dr. Richter is quick and easily carried out, but that it does not give results which correspond in every case with those obtained by bleaching to a standard color with a hypochlorite solution. Possibly in any single mill, where the method of cooking the sulphite fibre is not varied, it might be of sufficient accuracy to be valuable, but where fibres of different makes are being compared it can be trusted to give only approximate results, which at times may vary from the true value by as much as 1 per cent of bleach on the weight of the fibre. In the case of a fibre bleaching with 6 to 7 per cent of bleach an error of this magnitude would certainly be considered serious.

These conclusions of the author have been confirmed by a member of a Japanese firm of papermakers, who states that they have tried out the method and given it up for practically the same reasons. Nevertheless, it is hoped that these few observations may persuade others to contribute their experiences, as it is considered very desirable to have some quick and accurate method of determining the bleaching qualities of sulphite fibre .

In closing, it is desired to acknowledge the courtesies extended by Dr. Richter during the course of this work.

VENTILATION OF PAPER-MACHINE ROOMS

By LEO SCHLICK, M.E.
Consulting Engineer, Toronto.

(Written Specially for Pulp and Paper Magazine)

The ventilating question is vitally important in the efficiency of the evaporation of water on the drying surface of the paper machine. If the air in the paper machine room is saturated with vapor, a considerable amount of steam has necessarily to be spent within the dryers so as to overcome the resistance offered by the overloaded atmosphere. In the summer time the outside temperature delivers automatically a relatively warm supply of air, whilst in the winter time a dense fog will be caused if the air supply to the paper machine is not preheated.

This is due to the fact that cold air holds in suspension a considerably smaller quantity of vapor than preheated air. Indeed a given quantity of air at a given temperature can carry only a certain quantity of vaporized water safely without depositing the much-feared drops on roof or ceiling. Considering that a quantity of more than the daily production has to be evaporated on the drying surface, it should be carefully determined if the fan is amply dimensioned to take care of the requirements. The fan should be driven by a variable motor so as to allow adjustment when larger changes in the outside temperature take place. Paper or pulp drying machines of more than 30 tons capacity nowadays are supplied with preheated air by means of a fan properly pressing more or less heated air underneath and thus into the drying system.

The partly saturated air carrying off all the vapor from the dryers is then continuously discharged into the atmosphere, thus relieving the duty of the dryers, which are often none too large.

The proper ventilation of the paper machine room therefore is a steam-saver. But besides this the drying of the paper is so much more improved and in relieving the atmosphere from undue vapor the conditions for the crew are much improved, and just this will keep everybody fresh and fit for efficient work.

The following table gives all the data necessary to calculate the quantity of air needed with regard to the respective temperature with which it has to enter the sphere of absorption.

Temperature in Degrees Fahrenheit	Weight of One Cu.Ft. of Pure Dry Air lbs.	Weight of the Vapor in One Cu. Ft. of Mixture lbs.	Weight of the Air in One Cu. Ft. of the Mixture	Total Weight of One Cu.Ft. of the Mixture
0	0.086354	0.000077	0.086226	0.086303
12	0.084154	0.000130	0.083943	0.084073
22	0.082405	0.000198	0.082083	0.082281
32	0.080728	0.000300	0.080239	0.080539
42	0.079117	0.000435	0.078411	0.078846
52	0.077569	0.000621	0.076563	0.077184
62	0.076081	0.000874	0.074667	0.075541
72	0.074649	0.001213	0.072690	0.073903
82	0.073270	0.001661	0.070595	0.072256
92	0.071940	0.002247	0.068331	0.070578
102	0.070658	0.002999	0.065850	0.068849
112	0.069421	0.003962	0.063085	0.067047

122	0.068227	0.005175	0.059970	0.065145
132	0.067073	0.006689	0.056425	0.063114
142	0.065957	0.008562	0.052363	0.060925
152	0.064878	0.010854	0.047686	0.058540
162	0.063834	0.013636	0.042293	0.055929
172	0.062822	0.016987	0.036055	0.053042
182	0.061843	0.021000	0.028845	0.049845
192	[illegible]	0.025746	0.020545	0.046291
202	0.059972	0.031354	0.010982	0.042336
212	0.059079	0.037922	0.000000	0.037922

Weights in pounds.

In order to make the matter clear, we will calculate the quantity of air required for a pulp drying machine of 40 tons capacity at different temperatures.

EXAMPLE No. 1:

A pulp drying machine produces 40 tons of pulp, 90 per cent dry. According to tests the pulp leaves the last press 45 per cent dry. The expression of 45 per cent means that in a mixture of 100 there are 45 lbs. of pulp and 55 lbs. of water.

How many cubic feet of air should be removed if the temperature of the air just above the dryers is 72 Fahrenheit?

In the first instance, we will have to calculate how much water has to be evaporated per minute. 40 tons (= 80,000 lbs.) of pulp per 24 hours corresponds to

$$\frac{80000}{24 \times 60} = \frac{80000}{1440} = 55.56 \text{ lbs. of dry pulp per min.}$$

There are 45 lbs. of dry pulp in 100 lbs. of mixture,—

$$1 \text{ lb. of dry pulp in } \frac{100}{45} \text{ lbs. of mixture.}$$

$$55.56 \text{ lbs. of dry pulp in } \frac{100}{45} \times 55.56 = 123 \text{ lbs. of [mixture.}$$

That is to say that 123 lbs. of a mixture of pulp and water contain 55.56 lbs. of dry pulp at 45 per cent dry, and consequently 123 — 55.56 = 67.5 lbs. of water. As the pulp is to leave the drying machine 90 per cent dry, we find from the equation—

$$\frac{90}{100} = \frac{55.56}{X};\ X = \frac{55.56}{90} \times 100 = 61.73 \text{ lbs.}$$

that 6.17 lbs. of water has to remain.

And we obtain now:

67.50 lbs. of water carried by 55.56 lbs. of pulp less 6.17 lbs. of water to remain is = 61.33 lbs.

61.33 lbs. of water to be evaporated per minute and to be carried away by the air in form of vapor.

According to our table one cubic foot of a mixture of vapor and air at 72 degrees Fahrenheit is able to carry 0.001213 lbs. of vapor.

0.001213 lbs. of vapor 1 cu. ft. of mixture

$$1 \text{ lb. of vapor } \frac{1}{0.001213} \text{ cu. ft.}$$

$$61.33 \text{ lbs. of vapor } \frac{1}{0.001213} \times 61.33 \text{ cu. ft.}$$

$$= 50,560 \text{ cu. ft. per minute.}$$

EXAMPLE No. 2:

The temperature above the dryers to be 132 degrees Fahrenheit. Amount of water to be carried per minute = 61.33 lbs.

One cu. ft. at 132 degrees F. carries 0.006689 lbs. of vapor.

$$61.33 \text{ lbs. of vapor in } \frac{1}{0.006689} \times 61.33 \times 9168 \text{ cu. ft.}$$

$$61.33 \text{ lbs. of vapor in } \frac{1}{0.006689} \times 61.53 = 9168 \text{ cu. ft. [of mixture per min.}$$

In comparing the results of both examples, we clearly see that one cubic foot of a mixture of vapor and air carries about 5.5 times more at 132 degrees F. than at 72 only; which proves the necessity of installing fans with variable drive so as to keep the efficiency of the drying system up when working at different outside temperatures, which naturally influence the temperature in the machine room. The temperature in the machine room, however, will largely depend upon the production, and thus when running lighter grades of paper or pulp, must be adjusted.

The air to feed the drying system is heated in a system of steam-heated coils. The steam is to be either exhaust steam from a larger engine nearby or is derived from the small variable steam engine driving the fan which delivers heated air underneath the dryers. The heater should be provided with a proper steam trap in order to use the smallest possible amount of steam and to make further use of the condensed (and hot) water.

When relieving the crew and the machine from saturated air; the output as well as the toughness of the product will largely be increased. The undue resistance of saturated air decreases its capacity to readily absorb additional vapor. According to experience, the product will be the tougher the more there is an opportunity to dispose of the vapor (clinging to its surface) when passing from one dryer to the next.

Therefore, when feeding a drying system of a paper machine with heated air, there will be a certain advantageous loft drying, this, for instance, being the cause of the wonderful toughness of Holland straw board. This also means a saving of raw material.

[illegible]

CANADIAN COMPETITION.

H. D. Langille, of Portland, Oregon, one of the foremost lumbermen of the North-West, has a remarkable article in the American Forestry Magazine for February on Canadian Competition in the Lumber Industry. Unusually well informed regarding trade conditions, Mr. Langille is particularly well fitted to write a sound, practical article on this topic, and he discusses the situation in a forceful manner. His article which was prepared after extensive enquiry and investigation is a most valuable contribution to lumber trade literature and is one which every lumberman and timberland owner should not only read but should keep on file for reference. The facts and figures compiled by Mr. Langille are to be had in no other form with painstaking investigation. This article is another in the series regarding lumber conditions which American Forestry has recently been printing.

NEW MILL IN MAINE

Bangor, Me., January 20.—A résumé of the past year in the pulp and paper industry of Maine brings forth but few events of unusual interest to the trade. The erection of a new chemical mill with a capacity of from 60 to 75 tons of high grade pulp per day is the principal happening, and the plant which is being built at Old Town on the Penobscot River by the Penobscot Chemical Fibre Company will represent an outlay of nearly half a million dollars and be ready for operation in the spring.

THE SIZING OF HIGH GRADE LEDGER STOCK

By HARRY A. MADDOX.

(Written Specially for Pulp and Paper Magazine)

It is our intention in this article to treat only of the better grades of tub-sized ledger paper, not devoting any consideration to engine or resin sizing, although it must be observed that most machine made ledger papers are doped with a preliminary dose of resin for various reasons.

The preparation of size and the application thereof form one of the most intricate and difficult problems connected with the manufacture of first-class ledger stock. The procedure is inseparably bound up with the quality and character of the ultimate product, chiefly in relation to the writing and erasing efficiency, preservation of the condition of leaves in much used account journals and durability or longevity of stock itself. Connected with the size solution, there come up for consideration the questions of hide extraction, temperature, chemical character and quality of the water supply, maturing, dilution and application of the gelatine liquor, mode and duration of immersion of the paper, control of permeation temperature and method of drying. Then again, the condition of the paper or waterleaf before sizing is important, as also the effect of ultimate storage in regard to maturity of the stock.

In some large mills, particularly certain of the English hand-made mills, the papermaker prepares his own gelatine size direct from the horns, hoofs, hides and fleshings of cattle, the procedure running along the following lines. The clippings (preferably of hides) are first softened in cold water, containing lime, for 30 to 40 days. They are next thoroughly cleansed by first washing in running water and afterwards cutting up and washing in a dash wheel. To extract the gelatine, the mass is heated in a jacketed copper pan to about 185 deg. F., by passing steam through. The process takes from 10 to 15 hours, at the expiration of which the impurities are allowed to settle and the fats are skimmed off the top. The liquor is then drawn off and filtered to remove suspended impurity and insolubles and again the fats and scum is skimmed from the surface. The residual mass in the copper pan is treated again and again for extraction until the whole of the gelatine has been obtained, purified and added to the first batch. To preserve the extract from putrefaction, alum or formaldehyde is added.

Unless exceedingly large quantities of size are used in the mill, it is desirable to rely upon ready-made gelatine, as produced by firms specializing for papermakers. The advantages of preparing one's own gelatine are a doubtful cheapness and the fact that by a careful tabulation of experience data, and control of conditions, a size may be made from a well selected mixture of raw stuffs that will always give uniform results in regard to ultimate penetration and sizing efficiency of the paper. The disadvantage is that unless large amounts are being constantly made, no reliance can be placed upon the gelatine so far as uniformity nd scientific control are concerned. Then again, in the form of jelly (as stored by the papermaker who makes his own size) putrefaction more readily sets in, particularly on prolonged storage under unsuitable conditions. Makers on the wholesale scale air-dry their product, and sell it in thin cakes, or plates, which may be preserved for almost any reasonable length of time.

Coming now to the question of judging the material: Commercial gelatine should be odourless, transparent, and very pale in color. The color of the cake when held before good light is a fairly reliable guide, but it is much better to dissolve up into a solution of known strength over a water bath and allow the solution to jellify in a Nessler tube, comparing for color and opacity against an equal solution of a known and reliable make. Richly colored gelatines impart something of their tone to the stock during the immersion of the latter, and although the addition of good white soap may help to hide the dullness in a case of emergency, it is far better to secure the right gelatine at the onset. All gelatines for tub-sizing should be free from acid reaction and should be low in ash content, certainly not above 3 per cent.

To test for ash—Incinerate a known quantity of the gelatine in a platinum crucible, moistening the ash at intervals with distilled water until all the carbon disappears. On completion, weigh the cooled ash and calculate the percentage.

To test for Moisture.—Reduce the gelatine to powder, weigh out a set quantity and remove the moisture by heating in a water oven to 100 deg. Cool and dry in a dessicator until absolutely constant, then weigh and calculate on the difference.

Viscosity is a rather important determination and is ascertained by working to a standard strength of weak against the time required to run an equal quantity quantity from a burette. The result is compared against the time required to run on equal quantity of chemically pure water. A table of standards should be arranged.

Another method is to use the aerometer, a type of hydrometer, which gives right away the percentage strength or viscosity of the solution. The disadvantage of this instrument is that it records a certain amount of error consequent upon the varying proportions of impurity in the solution.

The extent to which the gelatine will absorb water is a reliable guide to its efficiency as a tub-size. This factor may be determined by taking a tarred portion of the air-dry gelatine and allowing it to stand in pure water for a period of 24 hours, after which it is withdrawn, drained and again weighed. The result is compared against a standard founded on a known brand. It is important to conduct the test under set conditions of temperature, 15 deg. being recommended for the water.

To test for gelatinizing power, a jelly of 5 per cent strength is prepared, and when set, a pinch is taken between the finger and thumb and judged for tackiness. With a fair experience a reliable opinion may be passed upon the size stuff, but the method is hardly scientific. A better test is to adopt a system of breaking or bursting the jelly by means of a small glass in a breaker tube suspended from a stand, and loaded gradually with lead filings, mercury, or shot, until the desired object is attained. The standard is arranged from the calculated results of weight required to burst the various types of gelatine jelly.

To prepare the size-vat solution from gelatine cakes, the latter require to be immersed in soft cold water until swelled sufficiently. The surplus water should retain its clear color, as a discolored liquor points to inferior gelatine. The swelled mass is then heated slowly up to 150 deg. F., in a jacketed vessel, at which juncture it should have completely dissolved. In this state it is practically ready for use, but requires diluting to about 5 per cent strength for the purpose of sizing the sheets. Much, however, depends upon the quality of the gelatine and the condition of the paper in regard to preliminary alum and resin sizing. Paper which has had a fairly heavy doping in the engine may not require more than a 3 per cent strength of gelatine, whilst unsized waterleaf may require even more than 5 per cent, particularly if the paper is damp and has been pulped rather free. Pulp intended for ledger paper, which has been resin sized, is partly proofed and takes up less gelatine. For this reason it does not make so efficient a paper as that which is completely tub-sized.

Damp paper takes gelatine size more readily than that which is dry, but the absorption is apt to be irregular, owing to the irregular disposition of the moisture. As a result, such tub-sized paper would exhibit a streaky or blotchy look-through.

The penetration of the size is largely dependent upon the viscosity of the gelatine solution. A thick, viscous liquid would not become absorbed by the waterleaf to anything like the same extent as a thin fluid. The degree of viscosity is mainly dependent upon the original character of the gelatine and extent of dilution, and as pointed out in an earlier paragraph should always be pre-determined by test. It must be observed that the degree of temperature at which the size solution is maintained affects its penetrative qualities. The hotter the solution, the more fluid it becomes, and accordingly more penetrative, but of diminished sizing efficiency.

Coming now to another very influential factor in sizing the effect of alum on tub-sized papers, generally, cannot be too strongly impressed. Apart from the relations between alum and gelatine it is understood that alum in excess in the stuffchest will adversely affect ultramarine coloring. Most of the popular azure-laid ledger papers are blued with ultramarine, and a distinct degrading of color takes place, where alum has been carelessly manipulated. This effect may not become immediately manifest, but on prolonged storage at the mill or in the stationer's hands, the change ultimately becomes visible, with serious results.

Another effect of excess of alum in the chest is the prevention of thorough permeation of the body stock by the tub-size. The gelatine solution composes itself only on the upper and lower surfaces of the paper, and by the action of the embodied alum becomes coagulated. The result is an inefficient type of tub-sizing which will not render the sheets proof against repeated erasure.

The fact that the gelatine solution is unable to thoroughly permeate the body stock does not necessarily imply an excess of alum in the stuff. An important factor is the retention of air in the interstices and in the unbroken canals of the fibres composing the stock. It is obvious that if several thicknesses of paper in close adjustment are dipped into the size solution there is no mode of escape open to the air naturally held in the paper. Again, if a single sheet or web is plunged direct and retained immersed for a period, with ultimate direct extraction and drying, the air experiences no prospect of expulsion or escape. Consequently, the gelatine penetrates to the interior of the sheet in unequal fashion and rests mainly as a film on the surfaces. When the sheets are exposed to air or heat after the sizing process, there is reason to believe that some of the air encased between the gelatine films will create a disturbance which may be sufficiently strong to deteriorate the efficiency of the surface sizing.

Still another factor towards the repulsion of gelatine from the interior of the stock is overheating after tub-sizing. Sudden heat, especially as in the case of cheapening the drying process by the utilization of heated drying cylinders or hot air fans, causes the gelatine to emerge from the interior of the stock and become fixed mainly upon the surfaces. In the case of high grade ledger stock, air or loft drying methods only should be resorted to, by which means the gelatine settles "in situ" and also forms an efficient unbroken film on the surface.

When the foregoing propositions are studied, and the various influential factors thoroughly understood, the reasons why so much undue breaking, cracking, rupturing and ink resisting occur, will be realized and appreciated.

One of the most reasonable objections to much of our present and high grade ledger stock is that it often refuses to accommodate the facility for speed of the fountain pen. Almost every bookkeeper has had the experience of having to make several attempts to form a solitary letter in ink. The same thing rarely happens with a steel pen-nib. Undoubtedly the main factor responsible for the behaviour of the fountain pen is the character of the sizing, which has too greasy and resistant a nature. The steel nib by virtue of its hardness and roughness by natural corrosion (however slight) overcomes or counteracts the nature of the sizing, but most fountain pens, being fitted with an irridium tipped gold nib, are unable to combat the over-sizing and refuse to flow the ink. Hand-made papers are particularly bad in this respect. No doubt an excess of size of a very hard nature, akin to horniness, is responsible for the feature. For fountain-pen writing on ledger stock, the surface sizing must be kindly and responsive to most delicate touches of the pen point. The matter is an important one to papermakers, and should receive some attention. We could cite a case where a large order was lost to a prominent maker of a really fine grade of ledger stock through the difficulty experienced in obtaining unbroken sequence of fountain pen writing. The type of surface under discussion not only occasions trouble to the bookkeeper, but also creates annoyance to the paper-ruler on account of the excessive wear on his latten brass pens. Nominally, the pens should show very little sign of wear after ruling, say, 50 reams of ordinary account book paper, but it is a definite fact that 20 reams of such paper as we have above-mentioned will account for half an inch of the pens. Much time is wasted, and extra expense and trouble occasioned through the inefficient character of the sizing.

A great deal remains to be said on the subject of tub-sizing, particularly in regard to the nature and effect of alum, effect of storage, problems of erasure, etc., but for one instalment we have consumed sufficient space. In a future issue we hope to have the privilege of treating in close detail on these matters.

Sulphite Alcohol in Sweden

By G. EKSTROM.

Condensed Translation from "Teknisk Tidsrift," by C. E. Bandelin.

Sulphite alcohol is made, as is generally known, from sulphite waste lyes, and up till now not only useless, but obnoxious, by-products of the sulphite pulp industry. The sulphite waste lye, which is simply let out into the rivers and lakes and there is only a nuisance, corresponds to more than 50 per cent of the wood used for the manufacture of sulphite pulp, which consequently up till now has gone to waste.

The sulphite pulp industry is one of the most important industries in several countries, and also one of the most rapidly growing. The manufacture of sulphite cellulose, for instance, in Sweden has been more than quadrupled during the last 13 years. In 1901 about 160,000 tons of sulphite cellulose was manufactured; in 1913, 700,000 tons. It has to be taken in consideration that these 700,000 tons produced per annum only represent about 45 per cent of the raw material, pulp wood, and that the balance, or over 50 per cent of the wood—over 700,000 tons, which to waste in form of sulphite waste lye. It is therefore highly desirable to utilize at least part of these immense quantities of organic substances, which are yearly let out into the rivers.

The fermentable saccharine carbo-hydrates in the sulphite waste lye are utilized for the manufacture of alcohol. It has to be noted, that the fermentable substances required for the manufacture of alcohol are easily dissociated combinations in comparison with other organic ingredients in the lye, and the saccharine substances must, therefore, first be reclaimed, if all the constituents of the lye are to be utilized. The manufacture of sulphite alcohol is therefore to a certain degree the starting point for all industries, which may depend upon sulphite waste lye as raw material.

At present about 63 millions of litres of alcohol of normal strength could be manufactured per annum from the sulphite waste lye in Sweden, but this quantity is increased every year, depending upon the rapid growth of the sulphite industry. If the development of the sulphite industry continues at the same rate as up till now, it would be possible to manufacture more than 100 million litres of alcohol of normal strength per annum after 10 years.

The manufacture of sulphite alcohol started in 1909. In 1912 about 4½ million litres of normal strength were manufactured, but the production has remained stationary at this point. The reasons for this astounding fact are not depending upon any technical difficulties. It is easy enough to produce sufficiently pure or sufficiently cheap alcohol for the different uses that are possible. As far as Sweden is concerned the reasons depend mainly upon unsuitable methods of distribution, which in their turn depend upon unpractical legislation.

The three sulphite alcohol manufacturing mills, existing at present, sell their output to the alcohol trust at a price of 6.67 cents per litre of 100 per cent alcohol. The cost of manufacture may be somewhat varying, but the manufacturer ought to be able to sell the alcohol produced on a big scale at a good profit, considerably cheaper. The unnecessary increase in the price is still more noticeable afterwards, when the denatured alcohol is treated and valuated as a pharmaceutical product. The alcohol trust selsl it in its turn to the retailers as a 95 per cent product at a price of 9.33 cents per litre, corresponding to about 9.87 cents per litre alcohol of 100 per cent. The public has then to pay 16 up to 26.7 cents per litre alcohol of 95 per cent.

The retail sale of denatured alcohol has further been burdened with troublesome administrative ordinances; in one town for instance it is not allowed to buy denatured alcohol without a certificate from the town magistrate, that the alcohol really is to be used for industrial purposes. It is easy to understand, that the technical alcohol under such circumstances hardly can be extensively used in Sweden.

The alcohol is mainly used, besides as for drinking purposes, in the chemical industry, for lighting and as motor fuel.

The alcohol has up till now, on account of its high price not been used in the chemical industry as extensively as for instance in Germany. There is also the inconvenience that only some of the denaturing agents allowed for other alcohol may be used for sulphite alcohol. An alteration of the law in this respect is therefore desirable and expected.

A great chance for an effective competition with kerosene seems to be open for the alcohol for lighting purposes. Alcohol incandescent lamps, i.e., lamps where a solid substance is made incandescent by means of an alcohol flame, give a beautiful white light, do not smoke and do not require any trimming. Such lamps of many good patterns have been in the market for several years. It is easy to change common kerosene lamps so that they can burn alcohol if an incandescent alcohol burner is substituted for the kerosene burner. A little less than half as much of alcohol as of kerosene is required for the same candle power and it consequently becomes cheaper to burn alcohol at a price for alcohol of 9.33 cents and for kerosene of 4.27 to 4.80 cents per litre. Besides the alcohol becomes cheaper the stronger the light required because the consumption of alcohol then is relatively reduced. This fact is of importance on account of the growing desire of the public to obtain more light. A kerosene lamp of 30 candle-power requires O.135 litres of kerosene per hour; an alcohol incandescent lamp of same candle power requires O.06 litres of alcohol. The consumption of alcohol becomes only 1-3 or ¼ of the consumption of kerosene as soon as a candle power of 100 or more is reached.

It is of importance, that the denaturing agent for alcohol for lighting purposes is pure, which has not always been the case.

As soon as a retail price of 9.33 cents per litre or less can be made profitable, by means of increased consumption and better distributing facilities, so ought an important part of the consumption of kerosene without difficulty to be substituted by alcohol.

It is well known, that alcohol mixtures can be used for driving motors. 18 litres of an alcohol mixture, containing 20 to 25 vol. per cent of benzol, corresponds to 15 litres of gasoline. Already such alcohol mixtures can probably be sold at a price of 5.85 cents per litre. A still lower price ought to be possible by using benzol from gas works or oils from sulphate lye recovery. The costs for denaturing, which now amount to about ½ cents per litre alcohol, ought also to be reduced through alterations of the laws for denaturation.

Motor alcohol at a price of 5.87 cents per litre can compete with gasoline at a price of 7.04 cents per litre.

It has to be remarked that the consumption of gasoline is increasing very rapidly, and as the production cannot keep up with the quickly growing consumption, the gasoline prices in the future as before will be showing a rising curve.

Motor alcohol, on the other hand, ought already now, as has been stated, to be sold profitably at 5.34 cents per litre. The development of the sulphite alcohol industry and eventually the introduction of a cheaper domestic denaturating agent ought to be able still further to reduce the price of motor alcohol. There is consequently a good chance to substitute the total present import of gasoline for motor fuel with motor alcohol.

It has, however, further to be taken into consideration, when considering the probable chances of development of the sulphite alcohol industry, that powerful economical combinations are interested in the kerosene and gasoline trades as well as in the alcohol trade, and a competition, disastrous to sulphite alcohol manufacture, may be feared. An effective protection against this can, however, be obtained through assistance from the government, and it is very probable, that the legislation will energetically support a domestic industry of such a great national economical importance as the manufacture of sulphite alcohol.

STRIKING FEATURES OF BRITISH PAPER AND PULP TRADES LAST YEAR

A Good Record for War-Time In Canada's Exports.

(From Our London Representative.)

The figures of the year's trading presented in January to the Houses of Parliament by the British Trade Board, should eliminate all the despondency and all the fantastic contentions I have been reading lately in connection with the possibilities of a paper famine in England; because, they are statistics that prove the importance and stability of the British Nation — in which Canada and Newfoundland have enjoyed a good share—while many other parts of the world are suffering from financial dislocation, which the great European war has promulgated. Needless to say, the statistics can only be regarded as highly satisfactory and on analysing them I have discovered that Canada has done remarkably well in her exports of pulp, while Newfoundland has created a record in shipments of reel paper. It is, indeed, gratifying to see Canada figuring so prominently in the pulp returns, as it is a sign that the British market is receiving more attention from manufacturers. A word of advice is, however, due to manufacturers of pulp and paper in the Dominion. It may safely be conceded that in Europe pulp and paper prices will within the next six months rise considerably.

That is the feeling in London and in Scandinavia, and when the war is over it is anticipated that the cost of pulp wood will reach such a figure—owing to the great demand there will be for timber—that paper manufacturers must recoup themselves from some source. That source will be in the selling of paper. Therefore, in all the circumstances it behoves the "Made in Canada" scheme being pressed up to the hilt, so to speak, and it behoves pulp and paper producers all over the Dominion to "sit tight" and work unanimously through the medium of their Association in the marketing of their products. Now is the time for pulp and paper men to put their house in order, as I am predicting a good and bright outlook for the mills—and the British market is always a customer to be studied in addition to the States. What predictions one may have in regard to Germany and Austria-Hungary's future, it is very difficult to expound them. I do know that the trade of these countries, along with the Belgian and French—only part of the latter country's trade is affected—is entirely cut off from the outer world, not to mention the British market, and how long it will take the millowners in the pulp and paper industries in these countries to recover themselves, and their industry and trade connections, all depends on the duration of the war and the depredations that will follow in its train. That's the main feature and that is one of the reasons why Canadians should "make hay while the sun shines." An indication of what German industries are like at the present moment is furnished by the admission of Herr Ballin, the managing-director of the Hamburg-Amerika line, and a personal friend of the Kaiser, that Great Britain has brought the whole of Germany's oversea trade to a standstill and the book-printers and publishing houses have issued a manifesto, a copy of which appears in the "Hamburger Nachrichten" in which they say: " . . . The highly developed book-printing and paper industry is suffering in the worst possible way from the present war distress . . . owing to the suspension of practically all businesses, and that the printing establishments which normally work for publishers are almost at a standstill, owing to the virtual stoppage of the publishing industry." Figures attached show that 29.3 per cent of the workers are on military service, while 22.5 per cent are out of work and only 10.4 per cent have occasional employment. In certain cities nearly 60 per cent of the printers are idle. Compare these conditions with the conditions prevailing in the British and Canadian industries. Where there is no publishing there is no paper used; and a decrease in the paper demand means the German and Austrian pulp mills at a standstill. It is therefore no wonder that Germany prohibited the exportation of all kinds of pulps.

Weighing up all these facts and conditions the British Trade Board figures on the state of the British trade in 1914—five months of which war has raged—must be considered highly satisfactory. For the sake of comparison I quote the total imports and exports of paper of all kinds, boards, envelopes, bags, playing cards, and unenumerated papers, for the past five years.

	Imports.	Exports.
1914	$6,787,962	$4,180,084
1913	7,674,539	3,678,680
1912	7,233,798	3,552,716
1911	6,574,194	3,311,867
1910	6,443,704	3,118,673

It will be borne in mind, of course, in weighing these figures that British paper manufacturers have for a short period in August been deliberately deprived of a considerable amount of export trade in order that the countries the British are at war with should as far as possible be subjected to economic pressure, which present conditions show to be a fact. Unfortunately no figures are available until June showing the imports of paper from Canada. Newfoundland is in the import list and I find the importations of reel paper from this source of supply totalled 1,034,256 cwts., compared with 860,123 cwts. in the year 1913. Turning to trade in the war period, that is August to December, the total imports for the five months reached £2,381,449, as against £3,281,614 for the corresponding months in 1913, when peace prevailed. From Newfoundland in the same five months the receipts of reel paper totalled 656,408 cwts., compared with 486,228 cwts., in the same period of 1913—an increase of 170,180 cwts. Since the outbreak of war, supplies of paper from Germany, Belgium and Austria-Hungary have not reached the British market. A considerable amount of reel paper is received from Germany, while paper not on reels, paper hangings, coated paper, and packing and wrapping papers are imported from Germany and Belgium, the total quantities from January to August being—Germany, 874,383 cwts.; Belgium, 93,467 cwts. Owing no doubt to the rush of newsprint the States supplies have risen from 41,418 cwts. in 1913 to 142,039 cwts. in 1914. Newfoundland and the States are the only two countries that show an increase in their supplies, except Norway, which shows an advance 874,520 cwts. in packing and wrapping paper. It may safely be said that had it not been for the war the import and export trades of Great Britain would have constituted a record. The war, however, has done the British paper industry, and the pulp trade some good; it has given things an impetus and reduced stock considerably. Also, the British Paper Makers' Association is leaving no stone unturned in the way of opening up new ground and new markets.

The export trade of the British mills which reached 3,127,404 cwts., valued at £3,189,084, compared with 3,498,914 cwts. valued at £3,679,195 in 1913, shows that the total exports to Canada amounted to 89,572 cwts., as against 132,260 cwts. in 1913—a decrease of 42,688 cwts. in 1914. These figures are made up as follows: Exports of writing paper, 3,698 cwts. (compared with 6,646 cwts. 1913); print paper 80,618, (compared with 121,649 cwts.); unenumerated paper 5,266 cwts. (compared with 3,965 cwts.). It is very doubtful if the war has militated against trade with the Dominion, as the progress of mills in the latter country has to be contended with. However, during the war period exports to Canada considerably fell away, the figures for the five months being 33,698 cwts., as against 43,823 cwts. for the corresponding period in 1913: The details for comparison are:

	1913. cwts.	1914. cwts.
Writing paper	3,674	3,692
Printing paper	38,527	27,742
Unenumerated	1,622	2,264
Total	43,823	33,698

This return shows a decrease of 10,125 cwts. during the war period, which means that Canada by means of a domestic supply, or through some other source, will have to make it good.

In 1914 the imports of wood pulp are a record—never in the history of the British paper industry have such importations been effected, which speaks volumes for the work of the Navy. For the past three years the imports have been heavy and Canada has had a fair share in the supplies. For comparison purposes I will quote the figures—the total figures since 1912:

	Tons.	Values.
1914	990,304	£4,888,480
1913	977,957	4,617,687
1912	925,591	4,418,522

Taking these quantities of pulp, together with the heavy shipments that are arriving in the various ports since the beginning of January, there is sufficient raw material and sufficient paper in stock to stave off a famine for the next nine months and probably longer. The principal imports from Canada consisted of ground wood and the following are statistics for the past three years: 1914, 110,331 tons, valued at £259,702; 1913, 69,090 tons, valued at £156,276; 1912, 42,398 tons valued at £102,102. As I have on more than one occasion pointed out Canadian pulp in England is very much appreciated. I have heard men that are now dead and gone praise it—men who knew what they were talking about. Only a couple of months ago one of the largest papermakers—and a member of a firm who makes pulp in Norway—told me that Canadian pulp was most suitable for the fast running machines of to-day and he preferred to handle it to any other. These testimonials should give confidence to Canadian pulp men, and particularly the people of Chicoutimi, who enjoy a large connection with the British market. Some people may say that the war gave imports of pulp a help-up. In some respects it did, but in others it did not. It is true that during September there was a big rush for prompt parcels, sellers demanding cash against documents, but prior to the war, owing to the dullness in trade, stocks at mills were not too small and the rush at outbreak of war was simply to guard against depletion in raw materials should any unforseen circumstances occur. This statement is borne out by the Trade Board figures in the war period, which are as follows:—

	1913. Tons.	1914. Tons.
August	80,140	52,020
September	99,257	171,234
October	94,805	115,474
November	79,020	71,639
December	109,019	75,260
Totals	462,241	485,627

These totals show only an increase of 23,386 tons of all kinds of pulp, which, after all, is not much in a large industry. But this increase is small compared to what Canada has succeeded in placing in the British market. Comparing the five months' war period with the same five months in 1913, I find that the Dominion has actually shipped 28,964 tons extra, which is something to be proud of, considering the distance to be covered and the presence of hostile ships on the searoute. Indeed, this increase would have been greater had shipments been resumed after the outbreak of war in August. The actual supplies from Canadian pulp mills in the war period have been as follows:

	1913. Tons.	1914. Tons.
August	4,182	2,998
September	10,900	....
October	5,151	26,037
November	16,116	32,027
December	3,625	7,876
Totals	39,974	68,938

These totals show the increase in trade over 1913 at a period when the two countries are in a state of war. Of course, there is no getting behind the fact that the cost of producing paper in British mills is costing more, and the shortage of colors has materially upset some portions of the industry.

Reverting to other incidentals in the production of paper the export trade in 1914 includes Fillings, China Clay, etc. The trade done was as follows:—China Clay, 628,610 tons exported, as against 629,703 tons in 1913, the States being large buyers; bleaching powder, 599,178 tons, as against 726,390 tons in 1913 (of which 228,870 tons went to the States, compared with 397,060 tons in 1913); soda compounds, 7,187,621 tons, as against 7,266,862 tons in 1913; dyestuffs 220,856 cwts., as against 196,819 cwts.;dye stuffs imported from all countries, 453,939 cwts., compared with 560,938 cwts. in 1913.

Ottawa Notes

Ottawa, Ont., January 25—Mr. George H. Millen has been appointed to succeed the late William Horsley Rowley, president of the E. B. Eddy Company, who died a week ago. Mr. Millen was formerly joint manager of the company and has been with them for many years. Mr. John Taylor, formerly assistant secretary of the company, has been elevated to the board of directors with the post of secretary.

That lumber and pulp and paper manufacturers who derive their power from the Chaudiere Falls had in the past been allowed to divert more water than they were legally entitled to was the statement made at a recent municipal meeting in Ottawa. Trouble in this regard may develop as a result of the serious situation brought about by the exceptional low water conditions last year, besides inconveniencing the power users, militated against the effectiveness of the civic waterworks and it has been claimed that the city was not being fairly treated in this regard. The matter will probably be looked into in connection with the construction of a new overland water pipe. It has also been claimed that the old pipe was injured as a result of the sinking of logs upon it but Mr. J. R. Booth has offered to raise this timber himself.

The Canadian Department of Marine has relaxed the regulations governing the sailing of vessels from Canadian ports for the United Kingdom with summer deckloads. In view of the congestion of freights this will be welcomed by exporters of pulpwood and pulp. The Canadian regulation as amended allows sailing vessels to leave with summer deckloads after March 1 and steamships after March 15 whereas formerly neither class of vessels could load in this manner and leave before March 16.

Considerable disappointment is being expressed in trade circles in Canada at the action of the Australian Government in increasing by considerable amounts the tariff on a number of commodities which she imports largely from the Dominion. In view of the negotiations conducted two years ago by Sir George Foster, Minister of Trade and Commerce for reciprocity between the Commonwealth and the Dominin, the adoption of an even higher tariff by the former comes as a surprise. The duties or practically all pulp and paper products have been affected. Printing paper, including news print, formerly free to all countries, is now duty free to the United States only and 10 per cent under the general tariff. Wrapping paper, including kraft, is now dutiable at $1.34 to the United Kingdom and $1.58 from Canada or other countries. The most marked advance is in the duties upon millboard, cardboard, pasteboard, greyboard, leatherboard, woodboard and manila board, from free preferential and 5 per cent general to 20 per cent to the United Kingdom and 25 per cent to all other countries. Strawboard has been increased to 49 cents preferential and 61 cents per cwt., in the general schedule.

A protest against the operation of the new Workmen's Compensation Act will be filed with the Ontario Government by the lumbermen and pulp and paper manufacturers of the Province, according to statements made here. The complaint is that the workings of the new act are unduly expensive and that to compensate workmen under its provisions costs considerably more than would be the case if accident insurance were taken out. Action will probably be taken through the lumbermen's safety association which was recently formed and of which Mr. J. R. Booth of the Ottawa pulp and paper firm of that name, is one of the provisional directors.

While the grounds for complaint differ one is that it tends to remove responsibility in any degree from workmen for accidents for which they may be to blame. Another, and the main one as stated, is that it will cost too much, Mr. J. R. Booth of Ottawa alone being required to pay almost $25,000. The Workmen's Compensation Board has, however, issued a statement in reply to these objections in which it claims that the rates paid by New York manufacturers to liability companies in which they are required to insure, are uniformly higher than the rates which Ontario employers will be required to pay under this system.

Marked tributes of respect were paid to the remains of the late William H. Rowley, president of the E. B. Eddy Company, which were interred a week ago after his sudden death in Toronto. The funeral cortege was an extremely lengthy one, including practically all the prominent business men of the city. H. R. H. the Duke of Connaught was represented by Col. A. P. Sherwood and also sent a letter of condolence to the family of the deceased manufacturer. Arichbishop Hamilton of Ottawa and nearly every Anglican clergyman in the city were present at the funeral services in testimony of the late Mr. Rowley's prominent connection with church affairs. During the funeral the Hull city flag was half masted, the various branches of the Eddy firm throughout Canada were closed while the entire plant in Ottawa was closed during the day.

MAC.

CONSERVATION COMMISSION DISCUSSES FORESTRY PROBLEMS

ADDRESSES DELIVERED BY SIR CLIFFORD SIFTON, DR. B. E. FARROW, R. H. CAMPBELL, G. C. PICHE AND H. R. MACMILLAN AROUSE INTEREST

Address of Sir Clifford Sifton, Chairman of the Commission

Forests.

In the matter of forest protection, the general aspects of the situation have not changed materially since our last meeting, though there have been improvements in some respects.

The fire season of 1914 was the worst since 1910 and the aggregate of loss will be heavy. Had it not been for the fire protective organizations established during the last three years, the loss might have approached the dimensions of a national disaster. Results have shown that these organizations are effective, but need strengthening to provide really adequate protection. In practically all cases, larger appropriations are needed, especially for the protection of young forest growth. This action, wherever practicable under present conditions, is fully justifiable on the ground that fire protection must be regarded not as an expense, but as an investment; necessary in the public interest, and one which will pay high dividends in the future.

SIR CLIFFORD SIFTON
Chairman of the Commission of Conservation

Inventory of Forest Resources.

The inventory of forest resources, begun in British Columbia and Saskatchewan in 1913, has been continued during the past year.

As indicated last year, there is strong reason for the belief that the forest resources of Canada have been much over-estimated, and the necessity for a general stock-taking is obvious, in order to provide the basis for a comprehensive plan for intelligent conservation.

In British Columbia, during 1913 and 1914, data have been collected covering over 200,000 square miles, at an average cost of about six cents per square mile. The explanation of this low cost lies in the fact that a very large amount of detailed information has been previously collected at great cost by the British Columbia Forest Branch, the Dominion Forestry Branch, the Canadian Pacific Forestry Branch, and a great many limit-holders. Practically all this information has been placed at the disposal of our investigators, and has been supplemented to a limited extent by further data collected by them at first hand, on the ground. Without the admirable co-operation of all these agencies the results which are being secured would be impossible, except at a cost that would be prohibitive to the Commission. It is hoped that with one more year's work, the report on the timber resources of British Columbia will have been completed. In addition to the descriptive text, this report will include maps showing land classifications, forest regions, silvicultural types, and range of the principal tree species.

In Saskatchewan, the work to date has covered some 60,000 square miles, but the information collected on a part of this area is not complete, on account of the fact that financial considerations made it necessary to discontinue the project. At least another year should be devoted to completing the work in Saskatchewan, but it does not seem possible to carry it forward during 1915. The investigations already made show that the total amount of spruce in the timber limit belt of Saskatchewan is discouragingly small, especially in proportion to the vast area over which this timber is scattered. Fire has been largely responsible for this situation, and the need is emphasized for more adequate fire protection.

The indications, from this uncompleted investigation, are that of spruce saw timber, there are in that portion of the province of Saskatchewan accessible by present logging methods some two billion one hundred million feet board measure. This area comprises 27,000 square miles and includes all the timber limits, for which specific estimates have been secured from most of the limit-holders. Between this timber-limit belt and the Churchill River is another area of 33,000 square miles, with no timber limits, and for which the incomplete data available indicate a total stand of one billion two hundred million feet of spruce saw timber, generally inaccessable under present conditions. North of the Churchill River is another vast area of 88,000 square miles, on which the timber is generally poor and scattering. Assuming this vast inaccessible area to contain two hundred million feet of spruce saw timber, we have roughly for the whole of Saskatchewan a total of only three and a half billion feet of spruce saw timber of which not quite two-thirds is accessible at present.

While no detailed study has been made in Manitoba and Alberta, a very rough indication may perhaps be secured by applying the averages found in Saskatchewan. If this be done, we would have for Manitoba about two and one half billion feet of spruce and for Alberta some six billion feet making a rough total for the prarie provinces of twelve billion feet of spruce saw timber.

While these figures are for the most part only rough approximations, they indicate clearly the depleted condition of these forests which, beyond a doubt, contained many times their present stand of timber before the advent of the white man, which has so generally been followed by destructive fires. With adequate protection from future fires, these great areas would gradually re-establish their former productivity of timber wealth.

Reproduction Study in British Columbia.

During the past summer an investigation was made by the Commission, to determine the conditions under which the reproduction of commercial tree species is occuring most advantageously in the coastal region of British Columbia. Particular attention was paid to the effect of fire upon the reproduction of Douglas fir, which is the most valuable and most widely distributed species in the province. The study was conducted by Dr. C. D. Howe of the Faculty of Forestry, University of Toronto. In this work the British Columbia Forest Branch co-operated by assigning a forest assistant to work with Dr. Howe, and by furnishing a considerable amount of information available from the head office in Victoria. The report is now being put in shape for publication.

The report emphasizes the fact that the popular assumption that nature alone will provide satisfactorily for the replacement of valuable commercial forests on cut-over and burned-over lands is only partially true. Nature is often times wasteful in her methods, and needs to be aided by man in order to secure the best results. This is particularly true with regard to forest resources. The detailed investigations made by Dr. Howe in British Columbia show, in the first place, that the burning of logging slash, at selected times and under proper supervision, not only greatly reduces the fire hazard, but favors the reproduction of Douglas fir, by exposing the mineral soil. However, repeated fires, and fires occurring during dry periods, not only destroy the young growth, but the seed trees as well, thus preventing or greatly retarding the establishment of a stand of commercial size. As a general rule, a sufficient number of seed trees is left after logging, so that one fire leaves enough for seeding purposes. Each fire thereafter, however, reduces them in proportionately larger quantities. Thus, through the diminution of seed trees each fire makes it increasingly difficult to re-establish by natural means, the forest on the successively burned areas. On this account, in many sections, reproduction of valuable species is wholly inadequate in amount, or is entirely lacking, unless artificial planting be resorted to, which is impracticable on account of the great expense involved. The same results can, however, be secured at relatively slight expense, by providing more adequate protection from fire on cut-over lands, especially those bearing young forest growth at the present time. The additional protection needed naturally means the employment of a larger patrol force than has previously been practicable, on account of the limited funds available.

Railway Fire Protection.

Under the fire regulations of the Board of Railway Commissioners, the railway fire protection work has been continued along the lines of organization and policy established during 1912 and 1913. Steady improvement has taken place, and along hundreds of miles of railway lines, the fire protective organizations of the railway companies have proved the most effective, and in some cases the only organized agencies in those particular sections, for the extinguishing of fires. Some of the worst fires have been those which originated at a distance from the track and in many such cases the railways have been very effective in checking the spread of fires, for the origin of which they were in no wise responsible.

The Board has established co-operatoin, in the handling of its railway fire inspection work, with governmental fire-protective organizations, in all of the forest provinces, with the single exception of Nova Scotia. In that province, the situation reported a year ago still exists, and active co-operation is still pending, awaiting the appointment of a provincial forester, for which appointment provision has been made by law. Fire protection in general, and the railway situation in particular, would benefit greatly by the early appointment of a qualified man to the position.

JAMES WHITE
Assistant to Chairman and Deputy Head, Commission of Conservation

At the last two annual meetings, attention was called to the need for more adequate control of railway fire protective work in a number of the provinces, along lines not subject to the Board of Railway Commissioners. This situation has to a considerable extent been cleared up during the past year.

Under the terms of the Canadian Northern Railway Guarantee Act, a number of provincially-chartered lines in the Canadian Northern system have been declared works for the general advantage of Canada, and thus come under the Board's jurisdiction. Of these, the most important are the Halifax and South-Western in Nova Scotia; the Quebec and Lake St. John, in Quebec, and the Irondale, Bancroft and Ottawa, in Ontario. Also the Canadian Northern Pacific, comprising the British Columbian lines of the Canadian Northern System, will come under the Board when it is completed and opened for operation.

The International Railway of New Brunswick, a provincially-chartered line, has been absorbed into the Government Railway system. The International runs through an almost solid forest, so that its acquisition by the Intercolonial serves to emphasize the need for the adoption of the same fire-protective measures upon Government lines that are required by the Government, through the Railway Commission, upon lines privately-owned. Upon the International, in particular, there is need for the establishment of special fire patrols and a thorough cleaning up of the right of way. Also, the special instructions to regular employees relative to reporting and extinguishing fires, issued during the past two summers, by the management of the Intercolonial, should be repeated prior to April 1, 1915, and each spring thereafter.

A year ago a resolution was adopted by the Commission urging that Government railways should be made subject to the Railway Commission, so far as fire protection is concerned. No action has yet been taken.

Reduction of Railway Fire Hazard.

Railway companies throughout Canada are seriously handicapped in their efforts at fire protection by the presence of large quantities of inflammable debris on Crown and private lands immediately adjoining railway rights of way. The prevention of fires through the reduction of hazard is a most essential feature of any campaign for better fire protection. All that the railways can reasonably be required to do under the regulations of the Railway Commission can never be more than partially effective as long as the lands adjoining their property are allowed to constitute the worst kinds of fire traps. Further legislation, coupled with adequate enforcement, are necessary in order to provide satisfactorily for remedying the condition on private lands and on Crown lands under license. As to Crown lands not under license, the remedy needed is not legislation, but provision for the expenditure of money, in order to gradually clean up the most dangerous sections. This, again, should be regarded not so much as an expense as a dividend-paying investment.

While the situation as a whole is still in urgent need of attention, distinct progress has been made along the line in some individual cases.

During the year, the provincial authorities of British Columbia have issued instructions requiring the burning of slash resulting from new public road construction and have also made provision for a beginning at cleaning up the old road slash, left from the work of previous years.

Although only a relatively small beginning has been made as yet, the situation should now improve from year to year. The reduction of fire hazard in this way will materially benefit the general situation, and will be of particular value in the numerous cases through the mountains where the public wagon roads parallel the railway lines closely.

In Ontario, provision seems to have been made for the satisfactory disposal of road slash on the very considerable amount of new construction, particularly in proximity to railway lines.

A particularly creditable piece of co-operation has been brought about between the Grand Trunk Railway and the Department of Lands and Forests of Ontario, whereby an excellent beginning has been made in reducing the railway fire hazard through Algonquin Park. This arrangement contemplates the careful and thorough disposal of inflammable debris on the Grand Trunk right of way and a strip of the Crown lands adjoining on both sides, through the park, the cost to be shared equally between the railway company and the provincial government. It is understood that this work will be continued next summer until the mileage through the park shall have been completed.

A further sample, on a somewhat smaller scale, is the work done by the Department of Indian Affairs in disposing of old slashings along the Canadian Pacific lines through the Shawanaga Indian Reserve, in the Muskoka section of Ontario. This work has been most efficiently done, and practically eliminates the railway fire hazard, which previously was serious.

In these, and other individual cases, the railway companies have shown a thoroughly co-operative spirit, which has gone far in inducing land owners to do their share and meet the companies half way. The continuation and extension of such co-operation will, in the course of years, reduce the railway fire hazard very materially.

Dominion Forest Reserves.

During the past year, material additions have been made to the area of Dominion Forest Reserves in Saskatchewan, but there are still large areas of non-agricultural forest lands in all the western provinces which should likewise be included in permanent forest reserves. At the present time, the total area of forest reserves and parks is as follows:

	Square Miles.
Manitoba	4,072.50
Saskatchewan	9,680.79
Alberta	26,270.90
British Columbia	3,777.56
Total	43,801.75

The net area of forest reserves alone is as follows:—

	Square Miles.
Manitoba	4,072.50
Saskatchewan	9,680.79
Alberta	19,473.15
British Columbia	2,749.56
Total	35,976.00

Areas temporarily reserved with a view of being later included in permanent forest reserves are as follows:—

	Square Miles.
Manitoba, approximately	700
Saskatchewan, approximately	3,200
Alberta, approximately	14,000
Total	17,900

This does not include areas which were examined during 1914, the temporary reservation of which has not yet been approved. Action to approve the reservation of these areas should be taken without delay.

Civil Service Reform.

The merit system of appointments is not yet in effect in the field service of the Dominion Forestry Branch. All experience goes to show that a really efficient field service can not be developed under the patronage system of appointments, and it is believed that in the interests of forestry the adoption of the merit system should be brought about at the earliest possible moment. The Canadian Forestry Association have also urged this reform for years, and it has similarly been recommended by Sir George Murray in his report to the Dominion Governmnt. It is, therefore, believed that the Government should again be strongly urged to place the field force of the Dominion Forestry Branch in the Inside Service, and to provide for the filling of all places by competitive examinations. Many of the force as at present constituted are technically qualified, but many others are not, and provision should be made for appointing only qualified men. This is the most urgently needed reform at the present time. Similar action is necessary as to the forestry and fire-protective services of the several provincial governments.

Forestry on Dominion Lands.

We are still faced with the anomalous situation of a practically complete divorce between the theory and practice of forestry on Dominion Lands held under license to cut timber. This matter was discussed last year, on the basis of a report made for the Commission by J. H. White, of the Faculty of Forestry at Toronto. It was then shown that while the Forestry Branch is well equipped with men technically trained in forestry, and is administering the forest reserves, as well as affording fire-protection both within and outside these reserves, it has absolutely no connection at the present time with the tdministering of cutting regulations on the licensed timber berths, although many of these timber berths are included within the boundaries of the reserves. This is because the timber berths are not legally a portion of the forest reserves. At the same time, the Timber and Grazing Branch, which is charged with the administration of the timber berths, has not, so far as known, even one man in its employ who has had any training in forestry.

As stated last year, the principal practical features of present-day forestry are such control of the methods of cutting as shall ensure the perpetuation of the forest, and such measures of brush disposal, as a fire-preventive measure as may be found practicable and desirable under the conditions of each individual case. The licensed timber berths naturally include the bulk of accessible merchantable timber on Crown lands, and it is obviously illogical and thoroughly undesirable in every way to permit the cutting of this timber without the most careful and intelligent enforcement of the existing regulations, which have for their object the perpetuation of the forest. Such enforcement is, however, not now provided, and is impossible under existing conditions of organization.

Forest Reserves in Ontario.

The present area of forest reserves and parks in Ontario is 22,574 square miles, or 14,447,360 acres. This area, while large in itself, is not great in comparison with reserves and parks in Quebec, nor is it large in proportion to the total area of non-agricultural lands in Ontario which must always be chiefly valuable for the production of timber. There are many millions of acres of cut-over or burned-over forest lands in this province, belonging to the Crown, which are now practically without fire protection, but which contain a great deal of young growth and much timber at present below merchantable size, but which, if protected from fire, would ultimately become merchantable.

The present annual revenue from woods and forests in Ontario is in the neighborhood of $2,000,000. It is obvious that if this revenue is to be maintained new areas must be continually opened up for lumbering, and this in turn necessitates the protection of the nonmerchantable areas and the young growth, in order that when the time comes, they may contain merchantable timber ready for cutting. Any other policy means the sacrifice of a large future revenue, in order to avoid much smaller present expenditures. The problem is undoubtedly a difficult one, since the expense of protecting the large areas of young growth during the necessary period of many years would in the aggregate be heavy, while there is at the same time a strong demand for the surplus revenues for purposes of general governmental administration. It seems probable that the situation could best be met by the adoption of a definite policy which would result in the reservation and placing under protection each year of a limited but definite area of young forest growth found upon examination to be most suitable for this purpose. An excellent step in this direction was the addition last year of 2,000 square miles to the Mississaga forest reserve, and 811 square miles to the Algonquin national park; but this constitutes only the beginning of what should be adopted as a definite and continuing policy.

The necessity for further protection of important watersheds must also be considered. Waterpower development is now a vital factor in the industrial life of the provinces, and this importance is bound to increase tremendously in the future. For the intelligent protection of this great interest forest protection is absolutely essential. A concrete example of this relationship was brought to the attention of the Commission at the annual meeting a year ago, by Mr. Challies, Superintendent of the Dominion Water Powers Branch. As a result of the representations made by Mr. Challies, a resolution was adopted by the Commission, favoring the establishment of a forest reserve on the upper waters of the Winnipeg River and especially on the watershed of the Lake of the Woods. So far as known, however, there has been no action upon this matter by the Ontario Government.

Trent Watershed.

At the last two annual meetings of the Commission there has been full discussion of the situation on the watershed of the Trent Canal, and resolutions have been adopted and transmitted to the Ontario Government. As far as known, there has been no action taken, and the situation remains unchanged.

The land surface of this watershed comprises some 2,000 square miles, of which about one-third, or 725 square miles still remains in the ownership of the provincial government. Of this, 450 square miles are still under license, while 275 square miles, or 176,000 acres, represent limits which have reverted to the Crown, after the licenses had lapsed or been abandoned. These crown lands are practically all non-agricultural, and are chiefly valuable for forestry purposes.

It is understood that, on account of financial considerations, and the existence of very large areas of similar or better forest lands in the province, for which it is impracticable at the present time to provide adequate protection, there is little hope of the provincial government being able to provide the amount of protection urgently needed in the Trent watershed.

On the other hand, the Dominion Government is vitally interested in this situation, having already expended some ten million dollars upon works pertaining to the Trent Canal. The protection of this watershed, and consequent regulation of waterflow, are essential to the full success of this undertaking. It is believed that, under these circumstances, the Dominion Government would be amply justified in incurring further reasonable expense for this purpose, in order to protect the investment already made, as well as the future expenditures which must be incurred in completing the project.

In the Dominion Forestry Branch, there is already in existence an organization admirably equipped to carry on this work. The Dominion Government has already been authorized by the provincial authorities to acquire Crown land in the Trent watershed at fifty cents per acre.

The most practicable method of securing a beginning in the solution of this problem would be for the Dominion Government to proceed with the purchase of such portions of the 176,000 acres of unlicensed Crown lands as are fairly contiguous, and place the same under the Forestry Branch for protection and development; or else, considering the benefits which such action would confer upon the province, it may be possible to induce the province to place such areas, free of charge, under the care of the Dominion Government, under an arrangement by which, eventually, financial satisfaction might be secured for the province.

Undoubtedly, some plan of co-operation could be developed whereby a system of fire protection would be established, covering the more important portions of the watershed.

The cost of this work would not be great, in proportion to the benefits to be received. In addition to the value of watershed protection, this work would have a very great indirect value as an experimental demonstration to all the provincial governments and owners of forest lands in eastern Canada, of what can be done in the way of restoring such waste lands to a productive condition. Educational work of this character is a thoroughly well-justified function of the Dominion Government, and is closely comparable to work which the Dominion Forestry Branch is already doing in the west, as well as to work in other lines which other departments of the Government are conducting throughout the Dominion. It is also directly parallel to work which the United States is carrying on in the eastern States, under the Weeks Law, which carries a large appropriation for the acquisition of non-agricultural forest lands on the watersheds of navigable streams.

The work in the Trent watershed could be taken up on this basis by the Dominion Government, without any large expenditure, either for first cost or for annual charges. Also, entirely aside from the indirect benefits resulting from better watershed protection, the investment would in the long run undoubtedly be a paying one, from the sale of forest products in future years. I addition, these relatively barren lands would be made productive and would thus add to the wealth of the country and afford an opportunity for labor on the part of the local population, which is able to find far too little remunerative employment under present conditions.

Wider Use of Western Coal.

During past years, there has been some difficulty on account of excessive fire danger resulting from the use, as locomotive fuel, of certain western coals having poor coking qualities. This difficulty has interfered quite seriously with the use of some of these coals by railways during the summer season. In order to increase their summer market, the Canadian Coal and Coke Company have employed an expert to devise a spark arrester which shall so check the emission of live sparks from the stack, as to permit the reasonably safe use of such coals the year round. The Grand Trunk Pacific Railway and the Operating and Fire Inspection Departments of the Railway Commission are co-operating with the Canadian Coal and Coke Company in the conduct of these experiments, which, unfortunately, are now delayed by the recent death of the expert and the necessity of securing a new man who is qualified to carry the experiment forward. The success. Such an outcome is greatly to be desired, results already secured give considerable promise of since the utilization of local coal supplies means the development of additional Canadian industries.

Co-operative Fire Protection.

A notable occurrence of the past year in eastern Canada was the organization last spring of the Lower Ottawa Forest Protective Association. The territory protected by this Association comprises some 7,500,000 acres, on the watershed of the Gatineau, Lievre, Rouge, Coulonge and Nation rivers, in the province of Quebec. The lines of organization are closely similar to those which had previously proved so successful in the case of the St. Maurice Forest Protective Association, the territory of which lies just east of the territory embraced within the Lower Ottawa Association. The combined territory of these two associations now comprises approximately 15,000,000 acres of forest lands. Both organizations cooperate closely with the provincial government of Quebec. In each case also, the Association manager is an officer of the Fire Inspection Department of the Railway Commission, and secures co-operation in that capacity from the railways operating within the Association boundaries.

Co-operative fire protection having proven such a success in a portion of Quebec, as it has previously proven in many portions of the United States, there is every reason to hope that the movement will continue, and in particular, that the plan at present under discussion of an association on the Upper Ottawa, shall be made effective.

Game Preservation.

At the last two annual meetings of the Commission, resolutions have been adopted favoring the establishment of a game preserve in those portions of Alberta and British Columbia adjoining the Glacier National Park of Montana. Through the extension of the Waterton Lakes Park, this action has now been taken so far as the Alberta portion is concerned, but no action has been taken in British Columbia. The provincial government very naturally objects to the establishment of a park in that section, which embraces a portion of the headwaters of the Flathead river, on account of interference with the further development of the natural resources, particularly coal. It should, however, be emphasized that the Commission has recommended only the establishment of a game preserve, and that this action could readily be taken without the withdrawal of either land or minerals from alienation, and thus would not at all retard the development of the natural resources of the section in question. All that is needed is the enactment of a law by the provincial legislature or the passage of an Order-in-Council, closing an area of some 320 square miles to hunting, together with adequate provision for enforcement. Unless the Government of British Columbia can be persuaded to co-operate to this extent, it appears that there will be a serious limitation to the efficiency of the measures already taken by the United States Government in Glacier Park, Montana, and by the Dominion Government in Waterton Lakes Park, Alberta, looking toward the preservation of big game, particularly mountain sheep and mountain goats. This proposal has the cordial support of the Camp-Fire Club of America, which has continuously urged favorable action during the past several years.

Scientific Investigations.

While fire-protection is the first essential to any plan of forest administration, it does not by any means constitute all there is to forestry, which is a well-developed science and profession in itself, even entirely aside from fire protection. The Dominion Forestry Branch, the British Columbia Forest Branch, and the Quebec Forest Service, all have quite extensive organizations, and have done excellent work, while the Ontario Government is doing less and has only the beginnings of a forestry organization. New Brunswick and Nova Scotia have no forestry organizations at all.

When we consider, however, that there was not one forester in Canada in 1899, we have good reason to be satisfied with the general progress made.

CLYDE LEAVITT.
Forester to the Commission of Conservation

R. H. CAMPBELL
Dominion Director of Forestry.

G. C. PICHE
Chief Forester, Porvince of Quebec.

H. R. MACMILLAN
Chief Forester, British Columbia.

Address of Mr. R. H. Campbell.

THE FIRE SITUATION DURING 1914.

Forest fires are, and still will be for some years, the great enemy of the forest in Canada. The danger to our timber supplies from this great destructive force has been iterated and reiterated until those who have heard it from year to year begin sometimes to wonder if we must always harp on the same string. But we are forced to play the one note till the country has learned it, and the returning vibrations do not as yet indicate any great or general degree of harmony on the subject.

The agitation that has been carried on for the last fourteen or fifteen years for better methods of prevention of forest fires has not been without effect, but perhaps a more potent cause of advance has been the recurring dry years which have caused great losses by forest fires and which have made the application of the lesson in so sharp and vivid a manner that it has been brought strongly home and has forced advances that would otherwise have been impossible.

In normal years the precipitation is sufficient with but a small or inadequately organized fire patrol to keep the fires in control, but at irregular intervals comes the dry season. When the high peak of danger is reached. Fires begin in different places in the dry vegetation or debris, the patrols are called to a dozen different points at once, the air becomes filled with smoke so that it can hardly be told where the fires are or whether new ones are beginning. Then only a thorough organization, a trained and sufficient force, officers of administrative ability, good lines of communication, complete equipment, can save the situation. Surely we have learned in the past few months that system and organization are of vital importance and that in days of peace we must prepare for war.

The year 1914 just past was, particularly in the western provinces, one of those years of deficient precipitation which test the strength of the defences against forest fires, and it will perhaps be of interest to contrast it with the nearest previous dry year, 1910, and find out what advance there was in preparedness to meet fire and what was the result.

I will confine my statements to Dominion territory, though the same principles will affect the work in all parts of the Dominion.

There was a very dry fall in the year 1909, not much snow during the winter and an early thaw in March, followed by cold, dry weather which made the very worst possible conditions for fire, and the dry conditions persisted, particularly in the province of Alberta, on to the middle of the summer. As a consequence the year 1910 was one of the most disastrous years for the forests since their protection has been given any attention, and the losses which occurred on the Canadian side of the border became only relatively less important in comparison with the very heavy losses of forest and other property and of human life in the States to the south of the international boundary. The number of fires reported on Dominion territory in that year was 1,227, and the most extensive areas of fire were in the Rocky Mountains in southern Alberta. One continuous area of fire in the foothills of the Rocky Mountains covered an extent of 494 square miles, and almost every man in that part of the country had to be called out to fight fire.

At that time the organization of the protective force was not at all thorough or complete. The Rocky Mountains were not then being handled as a forest reserve, and the area of forest reserve elsewhere was comparatively small, amounting to only 2,725,360 acres. Even the forest reserve administration was new and undeveloped, and it was not taken very seriously by the public, although the results of protection on the forest reserves were decidedly better than outside of them. The number of rangers employed on the forest reserves was twenty, and the number of fire rangers outside of the reserves was 107. On the forest reserves only a small beginning at improvements, such as roads, trails, etc., necessary for the protection of the reserves had been made, and in the districts outside of the reserves nothing of this kind had been undertaken except such desultory clearing as might have been done on a trail by a fire ranger as he passed along and found it necessary to clear an occasional fallen tree from the path in order to get through. The equipment of the ranger districts with fire fighting tools was not placed on any thorough basis, and it was usually difficult to get a supply at the right place when needed. No thorough system of inspection of railways, so as to ensure the carrying out of the regulations of the Dominion Board of Railway Commissioners in regard to measures for the prevention of fire, was carried out, although such an inspection had been tentatively begun during that year. It may also be added that organization of a fire patrol service had just been begun by the province of British Columbia, and was far from adequate.

The area covered by the fires on Dominion Lands reported in 1910 was 345,660 acres, and the quantity of merchantable timber burned was 185,350,000 feet board measure.

The year 1914 was also a very dry one. There was little or no snow in the winter and the spring and summer were very dry. From every district the report as to the dangerous conditions was the same, and the efforts of the whole staff were strained to the utmost to meet the situation. Their efforts met with considerable success as very many fires were prevented or stopped which would have caused serious damage, but at the same time there was considerable loss, which shows that there is room still for improvement in spite of the advances which have been made since the year 1910. The number of fires which are reported on Dominion territory for the year 1914 is 1406 (with two districts incomplete) and the number which did serious damage is about twelve. The total area burned over as reported was 438,567 acres and the quantity of merchantable timber damaged or destroyed was 350,000,000 feet board measure.

The expenditure for fighting fire was $70,000.

It would seem, therefore, as if the result in 1914 was worse than it was in 1910, in spite of the advancement in improvement works and fire fighting organization. Outside of two fires, however, which occurred in the Rocky Mountains, the damage was comparatively small. These fires occurred in a district which was well back in the mountains where there was no resident population to assist in fighting fire and where the road and trail system had not been worked out, and these fires are responsible for four-fifths of the damage. It is quite clear that no fire preventive plan is adequate until it is complete and that much remains to be done to give full protection.

In the districts outside of forest reserves the unknown causes of fire are over 50 per cent, and outside of reserves less than 40 per cent. Of the known causes settlers take the foremost place, especially outside of forest reserves, with the railways closely following, and campers in the third place; so that the chief causes of danger are well known and give some indication of the direction in which improvement must be worked out. In the mountain districts lightning is a frequent cause of fire, and as it usually strikes in inaccessible places, and is not amenable to law or argument, it is in some respects the most difficult to handle.

Organization.

During the year 1910 the organization of the field service consisted of one inspector of forest reserves and a number of chief fire rangers who acted directly under instructions from head office. When the very large additions to the forest reserves were made in the year 1911, including the eastern slope of the Rocky Mountains, it was necessary to provide a more intensive organization, and it was therefore decided to divide the inspection of forest reserves into four districts corresponding to the four western provinces, and at the present time the administrative work in each province is under charge of a district inspector whose headquarters are located in that province. The fire ranging outside of the forest reserves was until the present year placed under charge of a special inspector, but since the organization of the forest reserves has developed and the fire ranging has been better organized it has been found more satisfactory to have the inspector for each province handle the inspection not only of the forest reserve work, but of the fire ranging. The infusion also of a larger number of men in the administration who have been technically trained in forestry has resulted in a much better appreciation of the purposes and the lines of development in the forest reserves.

Each of the Forest Reserves has been organized with a Supervisor or Ranger in charge with a staff of Forest Rangers under him varying in number according to the size of the reserve. The Rocky Mountains Forest Reserve has been divided into four divisions or forests for purposes of administration.

The staff on the forest reserves in 1910 was 20, and in 1914, 142, but the area had increased in that time from 2,725,360 acres to 23,024,640 acres.

Improvements.

For protection further development has followed along well recognized lines. The improvement of means of communication is the matter of first importance in any fire preventive administration, and therefore considerable attention has been given to the developing of a system of roads and trails throughout all the reserves. In the year 1910 the number of miles of road which had been made in the forest reserves was 144, which included fire guards which had been cut out along the boundaries of the reserves. There are now within the reserves some 300 miles of roads, 1,249 miles of trails, 500 miles of fire guards ploughed, 400 miles of fire guards cut, and 200 miles of telephone line constructed. The advantage that such a system of improvements brings about in the administration of the forest reserves is very well shown by the system of roads, trails and cabins in the Clearwater Division of the Rocky Mountains Forest Reserve as shown on the map herewith. In the year 1910, none of these trails had been opened up, and if a fire had occurred inside of the mountains it would have meant a trip of two weeks or more to reach it, while at the present time any part of the reserve can be reached from headquarters in two or three days. Even this is, of course, slow, and the time will have to be shortened yet more if the fire situation is to be under control.

Trails.

The character of the trails which are being constructed has been very much improved. The trails are now laid out on a regular system of primary, secondary and third class trails. The primary trails are the main trails connecting all the important points in the reserve and are inter-communicating. They are made as thoroughly and as carefully as are the roads, the only difference being that the width is not so great. The secondary trails are not so thoroughly made, nor is there as much care as to the grade as they are to give access to special points; and the third class trails are as a rule merely cleared of obstructions.

When the work was begun there were, of course, some old trails, particularly old Indian trails, through the mountains, but these were usually in very bad order and were not laid out on any system that would facilitate the organization of the protective service. It has, therefore, been necessary, as a rule, to plan a completely new trail system, and this work is being done for each of the reserves as rapidly as it can be overtaken, and it is hoped that with the older established reserves this work will be pushed to completion within another two or three years.

Telephones.

The construction of telephone lines has not as yet been done extensively, as it is necessary first to know thoroughly the topography of the reserve and to lay out the system of roads and trails. A telephone system is a very necessary part of a protective organization, as it is the very quickest means of communication. On the reserves where the telephone system has been developed it has proved very useful. The greatest extent of telephone line on any one reserve which has been constructed up to the present time is on the Riding Mountain Forest Reserve in Manitoba, and this now practically covers the whole reserve and reaches every ranger district. The consequence is that the Supervisor in charge of the reserve can immediately get into communication with any ranger and can ascertain the conditions on any portion of the reserve at any time, and the ranger if he finds the conditions requiring additional help, or if he observes a fire which he is unable to reach himself, will immediately communicate with the Supervisor. This system worked very well indeed on the Riding Mountain Reserve during the past season and the Supervisor is of the opinion that the question of fire protection on that reserve has now been practically solved, provided the rangers do their duty.

Lookout Towers.

The lookout tower system has been established in the past year or two, and these towers have proved of such great value that advantage is being taken of all possible lookout points not only in forest reserves, but in districts outside. It is quite evident that a ranger following a land or water route through a forest has little chance of seeing a fire unless he stumbles on it, while the height of a tower lifting him above the trees may, especially on any elevation, give him an extensive view and the opportunity of detecting fire over a great area. In 1910 there were no lookout towers in use. In 1914 there were eighteen.

Buildings.

In the year 1910 all of the forest rangers on forest reserves were living outside of the reserves and had to go a considerable distance before they actually reached their districts within the reserve. As a result much of their time was lost getting to and from their work and they were frequently not on their districts at times when their presence was necessary. To remedy this difficulty houses for the rangers have been built on the forest reserves and now practically all of the rangers are living inside of the reserves so that they can keep proper control of their work. In the larger reserves some of the patrols are more than a day's trip and at many places cabins have been erected at suitable stages on the trails so that the rangers may have proper places to stay over night, when out on their patrols. Some 27 houses and 63 cabins have been built.

Railways.

In 1910 the Department carried out a patrol along the railway lines both under construction and in operation, but the railways themselves gave almost no attention to fire patrol work or to the regulations of the Dominion Board of Railway Commissioners for the prevention of fire. Some of our officers had been appointed inspectors of the Board, but the supervision had not been systematized. At the present time not only has the system of inspection by the forest service under the Chief Inspector of the Dominion Railway Board been well developed and a special staff appointed for it, but the regulations of the Board have been much more thorough and the responsibility for patrol has been placed on the railways. The results during the past year on most of the railway lines have been very gratifying. Of the larger companies the Canadian Northern Railway has in our experience taken the greatest interest in the matter, having appointed a special inspector of their own to supervise this work over their western lines. The Canadian Pacific Railway have also assisted very largely and the addition to the area in British Columbia over which oil burning locomotives were used has been of great assistance. The Grand Trunk Pacific Railway has, of the larger companies, shown the least appreciation of the necessity for improvement, and has not shown any strong desire for co-operation.

None of the big companies have, however, shown the utter disregard for the safety of the timber resources of the country or for the regulations of the Dominion Board of Railway Commissioners, as is shown by the Edmonton Dunvegan and Peace River Railway Company. Although this company was notified of the regulations of the Board of Railway Commissioners, and of the patrols which they were required to keep along their line, they persisted in ignoring these requirements all through the summer. Their patrol men consisted of their regular employees, who were engaged in other duties and paid no attention to the patrol. The locomotives used by them were usually improperly screened and in defective condition. They set out fire to protect a pile of their own ties and let it run loose over the country. Of 418 fires reported by the Inspector as due to railways, 250 stand to the credit (or perhaps rather the discredit) of this railway company, and nearly all these started within the 300 foot limit from the right of way fixed by the Board of Railway Commissioners as the boundary within which the railway company should be responsible. The Inspector received nothing but abuse for his efforts to have the regulations enforced, but he kept record of all infractions of the regulations, and the railway company was summoned before a meeting of the Board of Railway Commissioners at Edmonton on the 20th November, and after the case on both sides had been presented, a member of the Board expressed the opinion that the officers of the company ought to be in penitentiary, and drastic measures were threatened by the Board if decided improvement was not shown immediately. It is hoped, therefore, that there may be an improvement for next summer, but, of course, if that is the case, next summer will probably be wet, and there will not be the same danger. The company preferred to take the chances all through a dry season.

But while these mechanical helps toward a better administration are of importance, they cannot, in the forestry administration any more than in the army, take the place of the proper spirit and determination in the men engaged in the work. I think I may venture to assert that the spirit which the staff display in their work is better than it was in the year 1910, that their work is more intelligently directed and that the results are better. One important method by which this has been brought about is by having meetings of the officers, and especially of the rangers, once or twice during the year when they can discuss their work and the methods which have been followed in the different districts, improvements which have been suggested elsewhere, and when a better feeling of responsibility and of public service can be established. While it cannot be claimed that all of the rangers are conscientious in the work, I may cite as an example of the work done by these men for which they get very little recognition, the case of one ranger who was quite ill with dysentery when a fire occured in his district, and he fought fire for three days and three nights almost continuously, without being able to take anything more solid than a drink of water. Men who take their duties so seriously are entitled to the greatest consideration, but under the present system the reward which such a man may look forward to is that in case of a change of government he may be fired off his job if somebody else wants it.

In conclusion, let me state briefly four things which I consider essential for the establishment of an adequate forest policy to protect the forests of Canada:—

(1) The development of the forest reserve policy until all non-agricultural lands are included, and the carrying to completion of the system of improvements above referred to so that protection may be effective.

(2) Teaching the value of the forest from the business point of view. The forest has been regarded almost too much from the romantic or aesthetic side, and in consequence business men have failed to grasp its part in the development of the business of the community. In Scotland at the present time there is a strong agitation for the development of a forest policy which will provide for the planting up of large areas of the bare moorlands in the Highlands with two objects in view; first, the producing more wealth from the land than it can produce from grazing, for which it is now used; and second, for the increase of the population, and finally, from these two, the development of business. The same attitude was found in the Gironde in France, where at one time such area of the sand land as his voice could carry over was sold to any person for 25 francs, and where now such land is almost a gold mine to the private owners and the Government, besides protecting the agricultural districts and greatly increasing the population as a result of reforestation. If business people could be made to realize clearly that the attempt to farm absolute forest land in their own district is going to be a detriment to the district instead of a help, and that particularly in the western provinces, cities and towns which have timber resources behind them, are in a very much better position to build up industries than others, it should go far toward a better apprehension of what the forest policy means and its importance to their future.

(3) The possibility of infusing a proper spirit of public service into any organization depends a good deal on being able to ensure officers whose duties are of a permanent nature that if they do their duty efficiently they will be continued in service, and therefore it is very important that permanency of tenure of office during efficiency should be secured by such statutory enactment as may be necessary.

Legislation should be provided by the other provincial governments similar to that in force in British Columbia giving the fire rangers control of the setting out of fires for the clearing of land so as to prevent their being started at dangerous periods and to ensure that proper precautions are taken before fires are started.

Address of Mr. Piche.

FORESTRY SITUATION IN QUEBEC.

The Forest Service of Quebec was created in 1909 by Honorable Mr. Allard, the Minister of Lands and Forests, to succeed the former organization of Forest Rangers. The Forest Service received more extensive and more definite attributions and a subsidy of $55,000 was placed at our disposal. At that time, the personnel was composed of two Forest Engineers, three civil engineers, fifteen student assistants and some eighty rangers, explorers, etc.

In 1915, we find ourselves with a staff of twenty forest engineers, two civil engineers, fifteen expert scalers or special agents, and eighty forest rangers, explorers or guides, and the subsidy has now reached $100,000. As you will notice, the number of non-technical men has remained stationary, whereas quite a number of experts have been added to the force. This was the weakness of the former service; as to approach the lumbermen, to discuss with them the methods of exploitation, and to rule over certain difficulties, one must have a certain amount of instruction and be clothed with more authority than an ordinary ranger.

In order to recruit such men, it was necessary to provide a forest school which was established in 1910, at Quebec. The men follow a three years' course and work in the ranks of the forest service during the months of holidays, so that when they graduate they are familiar with our conditions and with the work they are called to do. The results of this system have been very good. Out of twenty-six forest engineers, who have now graduated from the Laval Forest School, we employ eighteen of them, the others having secured employment with some of the lumbering concerns in Quebec, or are working on their own account. May I mention that one of our men is now in charge of the Agricultural Branch in the Department of Agriculture of Quebec, whilst another is one of the engineers in the Quebec Road Department.

Now that we have succeeded in recruiting a technical personnel of some value, we expect to devote our attention to the training of forest rangers, that would be of value, not only to the government, but also to the lumbermen; and before long we expect to establish a ranger school. To complete this educational movement, we would have liked to have some of our men to lecture in the different centres, but this may be done only in the course of a few years, as there are more subjects to attract our attention at the present time.

As you are aware, the Province of Quebec has a total forest area of some 130,000,000 acres, of which 45,000,000 acres have been leased to the limit holders, 5,000,000 acres belong to the private individuals and the remainder, some 80,000,000 acres is in virgin forests.

We have very little to do yet with the management of the private lands, but we know that there are many reforms that should be made, and it will be one of the subjects to be taken over in the near future. We would like to establish a system of co-operation with the private holders so as to place their woodlots under a permanent system of exploitation. At the present time our activity in this field has been limited to the re-forestation of waste lands, and I may say that this movement has aroused a good deal of interest in the province. The demands for plants are now coming in greater numbers each year, so much that we had to increase the capacity of our forest nursery at Berthierville.

To protect our timber lands against the encroachment of land speculators under cover of colonization we have to maintain an active watch over the lots sold each year. As soon as we have collected sufficient proofs that the occupation of the land is not bona fide a report is made asking for the cancellation of the sale. Often our action is completed by the collection of heavy fines imposed upon the timber which has been cut in trespass. This rigid control has caused, it is true, a diminution in the number of lots sold each year, but we are led to believe that a better class of settlers has come to the front, knowing that they would be encouraged and protected against the land speculator.

We have devoted much time to the classification of land during last year, we thus examined nearly 500,000 acres. One of the elements of bad lumbering in certain sections of our province was the uncertainty in which were placed some of the limit holders, that part of their limits would vanish under the attacks of land speculators, and there was a sort of race between the lot seeker and the limit holder, the latter trying to cut the timber as quickly as possible in advance of the former. By a rigid inspection of the lots and a thorough classification of the townships these elements of disturbance have now disappeared and the lumbering is taking a more steady course.

On the South Shore we have even succeeded in creating reserves in which no sale of lots will take place before 10 years. We did not urge for a longer period as we are sure that within this time the public sentiment will be sufficiently educated to allow us to continue this policy without any difficulty.

The Forest Service has been charged with the exploration of vacant lands and last year our men made reconnaisances over some 8,000 square miles of territory. The information gathered has allowed us to offer some of these lands to the public, as timber limits and a sale was made last October; notwithstanding the disturbances caused by the war, the average price paid, for the bonus per square mile was much higher than any former sale.

Our control of the lumbering operation has been successful, thanks to the hearty co-operation of the limit-holders. In the pulp and paper districts, there is absolutely no reproach to be made to the operators, as the stumps are cut low, the tops are small, and in fact, the lumbering is more conservative than we dared to recommend in 1909. To encourage this good move and also to reduce the dangers of fire by minimizing the amount of debris, the Hon. Mr. Allard, Minister of Lands and Forests, has decided recently to give a rebate of 50 per cent of the stumpage, due for all logs less than 6 inches in diameter at the small end. Many lumbering companies have established a forestry branch or have appointed a certain number of inspectors to control their logging operations and are co-operating with us to the fullest extent.

Much attention is now paid to the rapid exploitation of windfalls and of fire or insect killed trees. The Government gives a reduction of stumpage in each case to stimulate the removal of these trees before they are too much damaged.

In the domain of forest entomology and mycology we have not done very much, first because of the lack of technical help and secondly on account of too much work in other directions. We have tried to correct this deficiency as quickly as possible and two of our young foresters are specializing in these important studies. Though we have not suffered too much of late from the attacks of the insects, we have to deplore the reduction of the reproduction of balsam fir and in some places of spruce by the defoliations of the spruce bud worm. The forest tent caterpillar has been very active during the last three summers, but, thanks to the Dominion Bureau of Entomology, our people have been instructed how to adopt preventative measures which will soon check this insect.

In many sections of our provinces, we find farms where the light soil uncovered by undue clearing or impoverished by a wrong system of cultivation has transformed into shifting sands, which not only have ruined the property of these farmers, but have also extended upon the adjoining lands. The sandy wave buries also the good soils and if not checked in due time may become a very serious plague. As found by the French foresters, who succeeded in reclaiming the immense sand dunes of the Gascogne district, the best method to deal with this problem is to establish first a temporary cover with beach grass, then to plant same with appropriate trees. We started this three years ago at Lachute, and to-day some 150 acres sown by beach grass and about 50 acres completely reclaimed with white pine, Scotch pine, spruce and green ash. Another experiment has been made, last autumn, along the main line of the Canadian Pacific

Railway, in the vicinity of Berthier Junction, and we expect to pursue this work vigorously next spring. As stated above, the reforestation movement is now taking much importance and we can expect much from this policy of placing again into value unproductive lands.

Though the protection of forest fires does not come under our attribution, I believe it my duty to mention here the excellent work done by my colleague, Mr. W. C. J. Hall, who succeeded with a small staff and a small appropriation to protect efficiently the vast area under his care. The lumbermen must also be congratulated, and we can mention with pride the excellent organizations of the St. Maurice Valley and the Lower Ottawa, which were the first of the kind in Canada.

Gentlemen, I believe I have said enough to prove to you that the forestry question has received the fullest attention from the Quebec government; I have not the least doubt that with the support of he auhorities and the co-operation of the lumberman, we will be able to do much more. Our province is rich in forests and in water powers, the necessary elements for the manufacture of pulp and paper so that we may contemplate upon a great future in this direction. But I expect also that the present cut of one billion feet from the forests under license can be increased largely without any damage to the normality of the stands, providing certain precautions are taken, i.e. provided a technical personnel is employed by the limit holders to prepare their working plans.

The cut from the private lands exceeds now 800 million feet. I think it could be increased by judicious management and a systematic reclamation of the waste lands.

Therefore our future is very bright; being placed at the door of Europe, we should be able to dispute their markets with any of our former competitors, but I believe, if the reports received are correct, that before long Norway will not be able to import pulpwood from Finland, and it is our duty to be ready when the time comes to take advantage of these new markets.

Address of Mr MacMillan.

THE ESSENTIAL FEATURES OF A SUCCESSFUL FIRE PROTECTIVE ORGANIZATION.

I wish to take this opportunity of expressing my appreciation of the valuable assistance which the Commission of Conservation has rendered to the British Columbia Forest Branch in taking part in a forest survey of British Columbia and in studying the regeneration of the forest on the logged over and burned over lands of the coast districts. The co-operative spirit which this Commission has shown has been a constant influence in forming public sentiment and in securing the information which must be the basis of wise forest administration.

I have been asked to discuss the principles of organization of a Provincial Forest Branch. This is, of course a very broad subject. We have not progressed as far in wise business-like forest administration in this country as might be expected of a people so dependent upon forests as we are. The reason for our comparative backwardness is to be found in public apathy—apathy founded on ignorance; ignorance of the importance of the national interests at stake; ignorance of the means which should be taken to maintain forest lands in productivity. I shall therefore discuss the problem for a few minutes from the educational standpoint, the standpoint from which it can best be attacked by this influential Commission.

The development of a sufficient forest policy depends upon the spread of three ideas:—

1.—That forestry represents a commercial and economical policy.

2.—That all non-agricultural land should be considered a public asset.

3.—That each Government owning timbered or non-agricultural land should maintain one organization charged to study the possibilities of those lands, protect and administer them accordingly.

There are an astonishing number of people in this country who misinterpret the term forestry, and oppose any extension of forest administration because of that misinterpretation. Such people believe that forestry is a conceit of sentimental persons who desire to protect woodlands, prohibit the cutting of trees; that it has its place only in parks where commercial operations are not contemplated. Or they may believe sincerely that forestry involves the expenditure of a great deal of Government money in the planting or cultivation of forests, expenditure which could never be repaid either as to capital or interest. Still another misconception of forestry exists in the minds of many persons connected with the lumber industry who believe that a Forest Department would import from Europe or elsewhere absurd regulations requiring the planting of a tree to replace every one cut or hedging logging operations about with killing restrictions. Such conceptions are, of course, founded on misinformation. They are nevertheless prevalent and are responsible for the fact that Canada is now, of all the countries, dependent largely upon forest industries, doing the least for the protection of the timber lands. These false interpretations of the term "Forestry" must be met and overthrown if public support is to be secured for a forest policy. The arguments with which they can be met are the arguments that appeal to the business man. Timber must be cut whenever and wherever there is a market for it, wherever and whenever the cutting of it employs labor and supports profitable industries. No expenditure should be made on fire protection or forest administration, which will not be returned both as to principal and interest by the produce of the land to which the expenditure is devoted. The lumberman or logger who fears the effects of forestry should be made acquainted with the manner in which forest policies have met the needs of industry in the Western States or British Columbia, where many millions of feet of timber have been sold to operating companies without any trouble over the adoption of regulations. The British Columbia Forest Branch alone has sold several hundred million feet of timber to loggers during the past two years, under regulations requiring clean logging and such disposition of slash as will prevent the accumulation of a dangerous fire hazard and will encourage the regeneration of the forest. There has been no trouble with the logging industry over the adoption of such a policy, rather it is supported by the industry. The important point is that, regulations are made as few, as simple, as economical as possible. They are framed with a knowledge of the logging conditions of the particular area to which they are to apply and their estimated cost is allowed for setting the price for the sale of the timber. The cost of the regulations falls upon the public in the case of such timber sales, which is of course proper as the regulations are designed for the public benefit. The logger or timber owner therefore has nothing to fear from forestry.

The proper interpretation of forestry and what it actually means to Canada cannot be stated too frequently. The future of this country depends upon our making every acre productive. Broadly speaking, the earth's surface can be made productive in two ways only, by producing agricultural or timber crops. South of the 60th parallel, about 69 per cent of the area of Canada is unsuited for agricultural crops. A very large proportion of this non-agricultural land is suitable for the production of merchantable timber. The production of forest products has been and will always be one of our chief industries. At the present time forest industries supply 12 per cent of our foreign trade, 16 per cent of our railroad traffic, and equal in value our annual wheat crop. We have a choice to make. Shall we let these valuable industries perish for want of raw material or shall we perpetuate them by protection of our present mature timber from fire, protection of the young forests on our non-agricultural lands and the logging of our forests in such a manner as to encourage the reproduction of valuable forests? The perpetuation of these industries and their source of raw material by the investment of such expenditure as the anticipated crop will warrant is forestry.

Optimistic as we have been in this country, we seem to have been unable to see any value worth caring for of such expenditure as the anticipated crop will warenough years ago when we heard of agricultural lands in the Peace River Valley to recognize that such lands, while unused at the time, would within a decade or two grow crops and support a population; we can look across the future to the time when our far northern mineral deposits, though inaccessible and incapable of development at the present time, will develop centres of industry; but we travel daily across the non-agricultural logged areas and burned over lands which surround many of our most densely settled communities and lie across our transcontinental railways and we see in such lands no asset. This attitude is both dangerous and unfair to the country. We must realize that our present stands of merchantable timber cannot support our growing industries indefinitely. The growing American demand for forest products, to which in a very few decades will be added a much greater market in Europe than now exists, will very rapidly wipe out our Eastern merchantable forests. Even now New Brunswick speeded up by foreign markets is cutting each year more than the annual forest growth from Crown Lands. This is a problem which must be faced squarely by every province. The future forest industries which are almost the only industries possible on three-fifths of the area of Eastern Canada must be supported by the timber grown on the logged over and burned over non-agricultural lands. Looking at these lands we should see not wastes holding no promise for the future, but productive lands needing only fire protection to enable them to support lumber camps, pulp mills, rural and industrial communities of a type which has done much for Canada. If the young forest growth on the non-agricultural lands of Eastern Canada had been protected from fire during the past twenty years, railroads would not now be importing railroad ties and sawmills in Western Ontario, each the centre of a thriving community, would now be supplying the world with lumber, which because of lack of forest protection in the past is being supplied from British Columbia and the United States. Many instances may be quoted which show that care of the young forest on non-agricultural lands is not only a duty we owe to posterity, it is an insurance of timber industries, which affects the prosperity of Canadians of to-day. Even agriculture will benefit by such a policy, for scattered through our non-agricultural regions are very many small areas of agricultural and semi-agricultural land which can only be developed if somewhere in the neighborhood the farms can find such a market for labor and produce as the timber industry affords.

The continuance of investigations similar to the study of the Trent Valley Watershed by the Commission of Conservation will have undoubted effect on the popular valuation of our non-agricultural lands, when it is shown that such lands will in 70 years produce a timber crop work 96 dollars per acre provided a fraction of a cent per acre per year is expended in fire protection, the public will readily support the fire protection.

The importance of timber industries to Canada, the certainty that such industries cannot be permanent unless the growth of another crop of timber is assured makes the practice of forestry imperative as an economic measure. Every section of the Canadian public is interested. Roughly, the proportion of unagricultural land in Canada south of the 60th parallel is Nova Scotia 81 per cent, New Brunswick 72 per cent, Quebec 76 per cent, Ontario 64 per cent, Dominion Lands 51 per cent, British Columbia 85 per cent. Some of these Governments already have Forestry Departments; none can afford to be without some forestry organization, charged with the study, protection and administration of timbered and non-agricultural crown lands. Such lands should be studied in order that the protective and administrative measures adopted may be decided with a full knowledge of the value of the products to be expected from the land. In this way expenditure is avoided on inaccessible and non-productive land which will not yield returns and the investment is made on those lands where quality and situation guarantee a profitable crop. In each province the area of timber-land is very great. The condition of forest growth, of fire hazard, of utilization are so variable that no rule of thumb methods may be safely adopted. The Forest Branch must include men trained to and free to study each of these problems in order that loss of revenue may be prevented and the most economical possible scheme of administration and protection worked out for each section of the country.

Our experience in British Columbia has been that the best results are secured at the least expense where the one organization, call it Forest Branch or Timber Department, is responsible for the necessary forest studies in fire protection as well as the routine, but highly technical business of timber administration. There are several advantages of such a consolidation of work. The first is the reduction of overhead cost. The head office looks after all work. One field organization serves all purposes. Frequently one man in a district performs various duties as ranger in charge of sealing, supervision of logging or fire protection. This form of organization meets with the seasonal character of forest work. The rangers who supervise logging in the winter are at the same time becoming acquainted with the fire hazards in their districts and are the best men available to supervise patrol and fire protection in the summer. It is thus possible to give good men permanent employment, and to offer them incentives for doing good work in a manner which would be impossible if the men were employed for summer work only. This increase of trained permanent men which is economically possible only where the one organization handles the protective and administrative work is the important feature of our present work in British Columbia. Other obvious advantages of such an organization are that all the timber-land whether forest reserves or not is under the one administration, the whole organization in any district is available under one head for any emergency work and the experience and knowledge of the country gained by a man in one branch of the work serves him in other branches of the work. The retaining of the best men from year to year makes possible the development of the expert forest ranger; a man experienced in the timber business of his district in scaling, fire protection and fire fighting, without whom no efficient forest administrative organization can exist.

I believe that everything that I have said here is self-evident. The man on the street would come to the same conclusion if he had the facts before him, and gave a few hours to thinking them over. The trouble has been that the man on the street, the Canadian at his business, has not been worrying over the raising of another crop on our timber-lands. The Commission of Conservation is in an excellent position to start him thinking, and I am confident that this Commission together with the various Forest Branches in Canada need only make a few studies and place the situation in concrete form before the public to ensure that in a few years public timber-lands will be studied, protected and administered in such a way as to maintain their productivity and to guarantee to Canada a permanent forest industry.

Dr. Fernow's Address.

Co-operation in Management of Dominion Timber Lands and Co-operation with Ontario on the Trent Watershed Survey.

The present time is not very opportune to suggest work and expenditures which are not needed with immediate urgency, and which can be deferred to the future without creating distress. And, I take it, most of the aims and objects of the Commission have to deal more with the needs of the future than with these of the present; and are, therefore, of a kind that can be delayed. Yet, may we not with propriety reverse the well-known advice and say, "in time of war prepare for peace," and imitate the brilliant example of the patriotic Dutch who in the midst of the distress and misery of their war of liberation, more than 300 years ago, when the choice was given them, preferred to establish universities rather than to accept release from taxation, exhibiting the most sublime patriotism.

There are two or three suggestions in the report of the Committee of Forestry, which may be accentuated, two or three directions in which progress could be made for the improvement of forestry conditions in the country even now, without any or with little additional expenditures, indeed with the result of greater efficiency and economy, by merely re-arranging matters. One refers to a re-organization of the administrative offices dealing with the crown timberlands of the Dominion. Another refers to an expansion of the scientific work of the Dominion Forestry Branch as basis for future forest management. The third refers to an arrangement by which the Trent Watershed, or portions of it, may come under the administration of the Dominion.

You have heard of the incongruous condition which prevails now in the administration of the public timberlands. Three separate and independently organized government branches divide authority over them. There is the Timber Branch, which is in charge of the licensed timber limits; the Forestry Branch, in charge of forest reservations, curtailed, however, by the timber limits within the reservations which had been licensed before the reservations were made; and the Parks Branch, which has charge of still other portions of the timber area. Each of these Branches works without any organic relation to the other, and in some cases exercising functions and dividing authority over one and the same territory.

Anybody with experience in business organization will admit that this is not good business.

The Forestry Branch, a creation of our Chairman, when he was Minister of Interior, was presumably instituted to bring into the administration technical knowledge which was to be utilized to insure continuity of our timber resources, so far as the Dominion controls them. Yet, all, or nearly all, the timberlands which can be utilized for the next 50 years are withdrawn under the licenses from its direct influence, indeed, are being cut-over without technical supervision and are gradually added to the mismanaged lands, which will be the burden of the future.

For the Parks Branch it may be said that the lands set aside and placed under its management are to serve a different object from the economic one of furnishing timber supplies, and hence a different management is required. Yet, there is no valid reason why the different objects could not be attained under one and the same administrative agency. Indeed, it would be possible to devise a management which would serve both park and economic interests.

The lands in this case, however, are territorially differentiated, and hence can be separately administered without much friction; only occasionally the fact that they are under a different Branch brings inconvenience, and interferes with a uniform and economic development. But in the case of the commercial timber areas the division of authority between Timber Branch and Forestry Branch leads frequently to friction and uneconomic procedures, because the divided authority lies frequently over the same area, namely whenever timber limits are included in a Forest Reserve. This is the case with most limits in Alberta and with many elsewhere. Here the Forestry Branch is charged with the duty of protection against fire and trespass for the timber limits themselves, as well as outside them, but has no right to interfere with limitholders who may be liable to trespass, or who may be responsible for fires by neglecting the prescribed conditions of logging and brush disposal. While the conditions of the timber licenses, as to cutting to a diameter limit, as to complete utilization, as to leaving the ground in good condition, including the possibility of brush disposal, are well taken care of on "paper," the personnel of the Timber Branch being essentially composed of office men, these conditions are most frequently not enforced in the "field."

In the territorially segregated timber limits outside the forest reservations this neglect is perhaps of little consequence, because these lands are mostly eventually to be turned to agricultural use; but those lying within the reservations become danger spots, and a handicap to the efforts of the Forestry Branch of developing a proper system of protection and better silvicultural practice.

A rational arrangement which can be effected without much upheaval would be to place the administration of these timber limits within the reservations at least wholly under the Forestry Branch. There will then be a territorial subdivision of authority which will obviate the antagonisms between different policies.

In this connection the question of personnel is all-important. It will never be possible to develop a technically sound administration through political appointees. Every effort should be made to build up an organization of competent, active, "trained" men, trained for the different duties of the field work, and made permanent under Civil Service rules. The higher grade officials, who can secure their training at the forest schools, will have to be used to become instructors in technical knowledge by means of short courses to the rangers who may have found entrance to the service by passing an entirely practical examination for ranger work, but are later expected to execute technical prescriptions.

The main point is to make the service independent of political changes, for in forestry work more than in any other business persistence and permanence are essential requisites.

With such an organization and extension of the functions of the Forestry Branch in the practical field, the opportunity for systematic study and investigation of the problems of silviculture become possible. We are lacking in Canada still the most fundamental knowledge of the biology of our tree species upon which their silviculture is based; we are lacking volume tables as aids to timber estimating, and yield tables as basis for calculating the results of our silviculture; all of which the Forestry Branch will then be equipped to furnish. It will also then be in position to do necessary experimental work and to establish demonstrations as to proper procedure in the field by organizing systematic management of forest areas.

One of these demonstrations, an object lesson of some usefulness to the people of the Eastern Provinces, could be made at the Trent Watershed to show how a mismanaged tract may be recuperated and become productive again.

I shall not repeat the arguments advanced in the original report as to why the Dominion Government should undertake the management of this tract.

In the report, it is suggested that the Dominion either purchase or else borrow free of immediate charge, under some financial arrangement from the Province of Ontario the necessary area. Under present circumstances the latter method will recommend itself, the "quid pro quo" to the Province to consist of financial returns when the property begins to bring a revenue.

To make the matter, especially its financial aspects, clearer, I may be allowed to present a tentative plan of procedure as an example.

Assume that at least 100,000 acres be taken under operation. This the Province is now under agreement to sell to the Dominion at 50c per acre. The Province may prefer not to part with the land, but permit its use under lease for demonstration purposes free of charge, provided that eventual profits from the management above a certain amount be covered into her treasury.

We may assume that one half the area contains natural growth, which, if protected against fire, and properly treated by thinnings, will grow into value, and that the other half requires artificial planting. The 100,000 acres could be selected to represent these two conditions.

We have then 50,000 acres growing naturally and 50,000 acres to plant.

To place the property in shape for management and provide it with a good system of fire protection and permanent improvements, such as surveys, roads, trails, watch-towers, telephone lines, ranger houses, may be calculated to require an expenditure of $10,000 during the first few years.

A manager and five rangers would make an ample personnel, requiring an annual outlay of, say, $6,000.

The 50,000 acres, to be planted in a 50-year campaign annually 1,000 acres, would require an annual outlay for 50 years of, say, $6,000. Add to this an annual outlay of $3,000 for improvements of the other 50,000 acres, and it will bring the annual charge to $15,000.

Summing up these quite generous initial and annual expenditures will make the cost of the property 50 years hence with 3 per cent compound interest, $1,750,000 in round numbers. We may now look at the credit side. Long before the end of the 50 year period, the 50,000 acres of natural growth will have begun to furnish saleable material. A live manager will, indeed, find that right from the start he can secure values which will in part cover expenditures. But to be conservative, we may assume that only after 25 years of improvements on an average 1,000 acres annually may be cut, yielding at a minimum 5 million feet B.M., which figured even at present prices—and these are bound to improve—would net $50,000. These $50,000 incomes, at 3 per cent will have accumulated for the 25 years up to the 50th year to around $1,800,000. In other words, before the 50-year period is expired the entire transaction will have paid for itself with 3 per cent compound interest. Any reasonable demand of the Province can then be satisfied, and there will be left 25,000 acres of improved natural growth, capable of furnishing a revenue of at least $50,000 per year, and 50,000 acres of plantations from 1 to 50 years old, which when ready for the axe, say, 20 or 30 years later, when the first crop is fit for cutting, may be expected to furnish additional income from the stumpage of 1,000 acres each year of, say, at least $300,000, pointing to a capital value of the property of $10,000,000 which we have built up during [illegible]

To give an idea of the rise of stumpage values in the past we may refer to the experience of Ezra Cornell, who selected timber lands in Wisconsin for the foundation of Cornell University. In 1866, he paid 60 cents per acre or 5 to 10 cents per thousand feet B.M. Of the 500,000 acres thus bought one-fifth was sold for $4 per acre, or 30 to 40 cents per M. feet in 1877, and by 1905 practically all the land had been sold, the last prices ranging from $10 to $12 per M. Now White pine stumpage in Wisconsin brings $20, and as high as $65 has been paid for selected trees.

The poorest kind of material for box boards in New England, sizes as small as 2 inches and lengths of 2 to 4 feet, brings $14 to $16 per M. f.o.b., while better grades of second growth bring $25 to $35 for round-edged boards.

the 70 to 80 years by an expenditure of less than $2,000,000. And this figure is arrived at, making allowance for failures and losses and by assuming no changes in lumber values.

It would not be surprising if twice the amount could be secured by that time.

That these figures are not fancies but reasonable possibilities will be admitted by every forester. Moreover, we have most convincing and illuminating evidence from France that such astonishing results have been actually attained. While the absolute figures attained in France may not be attainable by us, due to difference in labor and market conditions, the relative results show such margins that we can at least expect to make a promising approach to them.

Let me briefly cite these experiences. In the first half of the nineteenth century up to 1865 the State Forest Department planted 200,000 acres of sand dunes and placed them under management at a total expense of $2,700,000 or $13.50 per acre. A little less than half the area was then ceded to municipalities and private owners for $2,745,000, paying therefore, fully for the outlay, and the remaining 125,000 acres are valued at $10,000,000. In 1901, the first cutting was made and yielded $92 per acre from a property that had cost nothing.

The improvement by ditching and planting of the adjoining Landes, nearly 2 million acres, was begun in 1837 by private individuals, who by 1857 had reclaimed 50,000 acres. Then the government stepped in with a broad-gauge plan, building roads, railroads, drainage systems, and assisting the municipalities in reclaiming the land, making planting plans free of charge the State itself buying some 390,000 acres of land to enable the municipalities to accomplish the improvements. This once poverty-stricken district, which a century ago was hardly inhabited, is now traversed by the densest net of railroads in France.

By 1907, with an expenditure of around $10,500,000 ($6.50 per acre) 1,600,000 acres were reclaimed, 85 per cent in forest, of which the State owns somewhat over 100,000 municipalities 185,000, and private owners the bulk of 1,500,000 acres. In 1898, the value of these holdings, created from nothing, was estimated at over $96,000,000. In 1892, the average net yield was $2.40 per acre, and since then it has been rising so that now an annual income of $8,000,000 is the result. This from an expenditure of $10,000,000.

The third region of extensive waste land planting is that of the Sologne, near Orleans, a sandy, poorly drained plain on an impenetrable calcareous subsoil, giving rise to swamps. This was once densely wooded, but by the end of the eighteenth century some million and a quarter acres had been devastated, fully as much of our Ontario territory and abandoned. A committee of private citizens undertook its reclamation, and some 200,000 acres were planted at $5 per acre. An estimate of the value of these plantations places it at $18,000,000, so that lands which 50 years ago could hardly be sold for $4 per acre now bring over $3 as an annual revenue.

The fourth district lies on the arid limestone wastes in the province of Champagne. Here, since 1830, by private enterprise over 200,000 acres were planted and prepared for management at a cost of less than $10 an acre. The present stumpage value is figured at from $50 to $100 per acre, and, yielding $2 per acre revenue, this property is estimated at $10,000,000.

We have then here in France altogether 2 million acres, recuperated by an expenditure of less than $15,000,000, to now represent a capital of $135,000,000, or nine times the outlay, and an income of around $10,000,000, or, say $7 per cent on the valuation.

To assure you that on this continent not unlike results have already been obtained I may cite from an official Bulletin of the United States Forest Service (Bulletin No. 13), giving full details on the production of second growth white pine in New Hampshire, and New England generally, which shows that such growth on III. quality soil produces in 80 years 8,820 cubic feet, equivalent to 50,000 feet B.M., and on best quality soils more than 50 per cent more, while we have assumed in our calculations only 30,000 feet as a conservative figure.

Stumpage values actually obtained for the inferior second growth vary here from $4.73 to $8.48 per M. feet, or between $200 and $358, or $280 in the average per acre for 70-year-old wood, while the cost of raising the crop, including cost of land, taxes, protection, planting, etc., with 4 per cent interest to the 70th year average of $140 per acre, leaving a net return of $140 from land valued at $5 per acre.

It is interesting to note that under the market conditions in New England, even 35- to 40-year-old wood can be profitably marketed.

The one thing that I wish most to impress on you with this discussion is that forestry deals with long time periods and can only succeed by well laid plans carried out persistently through long periods.

Such persistency can only or mainly be expected from the State: Forestry is distinctly State business. But only when it is divorced from politics and administered on business principles under systematic plans does it produce the astonishing results which we have cited.

It is for the Commission to see the distant future and to help inaugurate and make possible such plans—and now is the time to begin.

NEWFOUNDLAND NOTES.

(Special to the Pulp and Paper Magazine.)

A cargo or two of pit props already landed in England and several more to follow is the sequel to the visits made to Newfoundland last October and November by representatives of English collieries. These contracts were undertaken and fulfilled at great risk. No calculation could be an absolute criterion as to the profit or loss of the work. External influences in the modus operandi, such as bad weather, might possibly effect for the local man a dead loss; however, men who have made the experiment, say that the game is worth the candle.

Some of our local timber experts in the past desirous of making deals with English companies, made calculations of the price of manufacturing in and exporting of paper from this country. These prices were very low. The reports of these men are now used, and by a process of induction, the English buyers obtain the cost of obtaining a log the size of a pit prop. With this basis of calculation they have, unsuccessfully, needless to say, tried to contract with men in Newfoundland. The absurdity of this reasoning is only too apparent. Whilst the exportation of paper has no restrictions placed on it, the exportation of pit-wood from the country is limited to one year, therefore it can not be expected that the industry, for such a short time, will be carried on in such vast proportions as to produce the wood at a minimum figure.

It is expected that when the legislature meets this winter strong petitions will be urged for extending the law re pit props from one to five years.

The season for logging promises to be most successful. The condition of the weather has been ideal for the logger. Though the frost has been a little intense, it has been unaccompanied by any large amount of snow.

In the "Royal Gazette" of last week application for timber areas in Newfoundland and Labrador reach approximately four thousand square miles.

Amongst the various applicants appears the name of Mr. W. H. Taylor. Mr. Taylor made application for approximately two hundred and fifty square miles.

Some thirty of the Harmsworth employees engaged in their Grand Falls paper mills have enlisted in the volunteer regiment for the front. During their absence the company with its noted generosity offered to make good the difference between their present wage and that of the army, and on their return from active service all positions will again be open to them.

Mr. Vincent Jones, superintendent of the paper mills, Grand Falls, left to join his regiment in England. The position vacated by Mr. Jones has been filled by Mr. W. Scott, who previously was assistant superintendent.

UNITED STATES IMPORTS.

The Department of Commerce has just issued its monthly Bulletin showing the imports and exports of merchandise during the month of November. Quite surprising, and almost beyond belief, are the figures that represent the figures of the imports of paper into this country during the past November. Owing to the war in Europe and the general curtailment of ocean traffic, it is generally thought that the November imports would fall far below those of the corresponding period in 1913. However, the figures of the Department tell the tale. The value of the imports of paper and manufactures of paper in November, 1914, was $2,397,755 as against $2,252,015 in November, 1913.—This shows a gain instead of a loss. Of the amount of paper coming in November, newsprint paper was valued at $1,077,179, of which $1,044,921 was imported free of duty, as against a total of $949,982, of which $913,440 was imported free of duty, brought in in November 1913.

The proportion of increase was not confined to the month of November, as the figures given out by the Department for the eleven months ended November 30, 1914, show that the total imports of paper into this country during that period was valued at $[illegible], which is compared with $[illegible] brought in during the corresponding eleven months in 1913 and $17,-[illegible] in 1912. This shows the gradual increase in our imports, notwithstanding the troubles abroad!

Imports of wood pulp during November totalled 66,643 tons, valued at $2,333,299, as against 85,640,435 pounds, valued at $1,210,653 brought in during the corresponding month in 1913. These imports are subdivided into grades as follows:

November, 1914.

	Tons.	Dollars.
Mechanically ground..	18,934	[illegible]
Chemically Unbleached ..	36,665	1,400,920
Chemically Bleached ..	11,044	602,152
Total ..	66,643	2,333,299

November, 1913.

	Pounds.	Dollars.
Mechanically ground	31,324,656	255,641
Chemically Unbleached	48,324,656	819,817
Chemically Bleached	5,769,671	135,195
Total	85,640,435	1,210,653

The imports of pulp for the eleven months period ended November 1914, totalled 541,981 tons, valued at $18,405,379, which is compared with the corresponding periods in 1913 and 1912, respectively as follows: 977,097,031 pounds, valued at $14,397,774, and 979,492,292 pounds, valued at $13,531,669. The subdivision of these figures into grades follows:—

Eleven months period ended—

November, 1914.

		Pounds.	Dollars.
Mechanically ground	(free) ..	167,954	2,741,306
	(duty) ..	......	....
Chemical, unbleached	(free) ..	270,518	10,252,858
	(duty) ..	......	....
Chemical, bleached	(free)	103,509	5,411,215
	(duty) ..	......	....
Total		541,981	18,405,379

November, 1913.

		Pounds.	Dollars.
Mechanically ground	(free).	264,779,439	2,114,387
	(duty).	35,493,698	279,909
Chemical, unbleached	(free).	208,235,406	3,469,803
	(duty).	328,644,859	5,286,518
Chemical, bleached	(free).	44,414,318	1,040,725
	(duty).	95,529,311	2,206,432
Total		977,097,031	14,397,774

November, 1912.

		Pounds.	Dollars.
Mechanically ground	(free).	289,344,161	2,382,223
	(duty).	41,429,512	328,605
Chemical, unbleached	(free).	42,458,100	709,376
	(duty).	463,334,063	6,996,851
Chemical, bleached	(free).	11,298,852	288,960
	(duty).	131,627,604	2,825,654
Total		979,492,292	13,531,669

NEW DAM ON ST. CROIX.

The St. Croix Paper Company has completed a new international dam at Grand Falls of the St. Croix, on the boundary between Maine and New Brunswick. This work was started in 1912 but suspended the next year. It was designed to give additional power at the Woodland plant of the company.

The [illegible] Pulp Company has built a small mill at [illegible] to replace the one destroyed by fire during the past year.

The Eastern Manufacturing Company, which has a large plant at South Brewer manufacturing bonds, ledgers, envelope and other high grade papers has had a prosperous year according to Supt. J. J. Sullivan.

This is one of the few mills in the United States manufacturing the same grades of papers which has not had a shut-down during 1914, but has run to capacity the whole year.

BRITISH TRADE NEWS

SPECIAL TO PULP & PAPER MAGAZINE

The Lancashire and Scotch newspapers have published short accounts of the paper trade in 1914. At Aberdeen it appears all departments in the mills have been busy and there is every promise of a continuation of the same conditions during 1915. In Lancashire, the great newsprint producing centre, it is said that consumers of newsprint got into a panic, and prices had a sudden jump upwards at the outbreak of war. Prior to the war trade was in a poor state, but the outlook now is most favorable. The brown and wrapping paper mills have had an average year, the mills working full time and profits and dividends have been well maintained. Since August last trade has greatly improved. Mills making printing papers and other high-class grades have had a fair year and the prospects in 1915 are looked upon as satisfactory. The wall-paper trade is the only one that has been hard hit by the war.

* * *

In recent notes in the British Trade News reference was made to the benefits derived from a good fire-brigade in a mill. It now transpires that the Fire Insurance Companies are considering their position in regard to the risks, as they find the tariff charged does not fully compensate them. Mr. John Dobson, of the Royal Insurance Co., says that assuming the tariff is 7s 6d per cent, there would be a balance of £58,839 against the companies in ten years, but if it was 9s 6d or 10s 6d per cent there would be a reasonable profit. For every £1, he adds, the companies have received in premiums during the past 10 years, it has cost them £1 1s 7d, but for every £1 they had received in premiums during the past three years, they had been paying out something like £1 6s in actual losses.

* * *

The national dye scheme, in which papermakers are deeply interested, is being pushed forward with much promptness. The capital is 4½ million pounds and the Government is at the back of affairs, while a new company is being formed which will start with the control of certain good concerns. It will extend its operations in every direction in order to best meet the emergency. Of course, the company is not yet actually formed, but it is only a matter of time for it to come into existence. The whole point in the scheme is that in future the British trade must not be dependent on the Germans for the supply of dye-stuffs. Seeing that the Government has moved in the matter, some people contend that the authorities should find all the money and, or should, guarantee interest to those who may do so. The reply to this contention is: The Government requires, and it was agreed by the recent conference, that those whose vital interests are involved, should do their share in the matter. On an annual trade of £200,000,000 the £3,000,000 to be raised is only 1½ per cent. The first amounts called up are very small, and the remaining amounts are also on very small instalments at very long dates. The money put in will be ample to build up a great industry, and necessary to expend £250,000 a year for this purpose, if at the end of 10 years it has been found that it was there should then be an earning power and a goodwill in the company equal to the outlay. Experts say that it is quite possible to compete with the Germans. They say that British resource, skill, courage, and capital can do it easily.

* * *

The eightieth ordinary meeting of the shareholders of the Bury Paper Making Co., Ltd. (in Lancashire) was held recently, and the report of the directors was passed as well as the resolution as to dividend. The directors' report for the half-year ending 28th November, 1914, showed a gross profit on the trading account of £8,692 0s 6d. After charging that account with interest, depreciation, etc., this half year, amounting together to £3,487 6s there is left a credit balance of £5,204 14s 6d as the net result of the half-year's working. To this amount must be added the balance from last year amounting to £14,553 1s 6d, which then leaves a disposable balance of £19,757 16s. The directors recommend the payment of a dividend of 10 per cent per annum on the 6 per cent preference and 10 per cent per annum on ordinary shares; plus a bonus of 2½ per cent per annum on the 6 per cent preference and ordinary shares; amounting together to £3,297 4s.''

* * *

An interesting article appears in the ''Surveyor,'' pened by Mr. G. Bertram Kershaw (late engineer to the Royal Commission on sewage disposal) in which he deals with the purification of waste liquors from paper mills. He points out how extremely variable are the analysis of liquors and mentions that the main difficulty in treatment is likely to arise from the solids, both in suspension and in solution. Further, it must be remembered that paper mills discharge very large volumes of waste waters, 1,000,000 gallons and upwards per twenty-four hours being by no means uncommonly met with. Mr. Kershaw adds: ''The main point in the treatment of waste waters from the majority of paper-mills is ample tank capacity, well designed tanks, and most important of all, frequent attention for cleaning purposes, without which no system will give good results. The temptation to run tanks for too long periods is, of course, great, since it means less sludge production; but it is bad for the river which receives it. In many trades recovery of what were formerly regarded as wastes is becoming more general, and a manufacturer frequently finds nowadays that in the past he has been throwing away valuable material, the recovery of which not only ften pays for the cost of recovery, but yields in addition a handsome profit.'' He mentions also that in the case of mills using wood pulp, care is usually taken to save any pulp, either for re-use in the mill, if clean, or for disposal to other mills producing papers of inferior grades. ''It is,'' he says, ''of distinct advantage if the various wastes can be stored before tank treatment, in order to equalise their varying strengths, characters and temperatures.''

UNITED STATES NOTES

(Special to Pulp and Paper Magazine.)

The Newton Falls Paper Company, Newton Falls, N.Y., has purchased the soft wood stumpage of approximately 6,500 acres of virgin forest from the Middle River Timber Company. The transaction, which has just been consumated, is one of the largest and most important that has characterized the lumbering operations in northern New York in a number of years. The limits are within fifteen miles of Newton Falls, and operations will be started the coming spring. A railroad line will probably be run into the depth of the woods in assisting the cutting. The stumpage will represent approximately 125,000 cords or more of pulp wood. The forest is mainly of spruce. The deal involves an outlay in the purchase and future lumbering operations of about $1,500,000.

* * *

The Portland Company of Portland, Me., has furnished to the University of Maine, an experimental digester for the use of the Pulp and Paper Department. The digester has a capacity of a little over one and one-half cords and is adapted for the manufacture of sulphite pulp. The Portland Company, because of its interest in the Pulp and Paper Department of the University, furnished this digester at about one-third the regular price.

* * *

The annual meeting of the stockholders, officers and directors of the Mead Pulp and Paper Company, Chillicothe, Ohio, was held during the interval in the company's offices at Dayton. Despite the general depression throughout the country and the curtailment of business in nearly all lines of trade, the sales of the company for 1914 were equal to the figures of 1913, according to the President's report. The officers elected were George H. Mead, Dayton, president; H. E. Talbott, Dayton, vice-president; R. T. Houk, Dayton, secretary, and Arthur L. Rieger, Dayton, treasurer. The directors chosen are as follow: George H. Mead, H. E. Talbott, R. T. Houk, Charles A. Craighead, all of Dayton; Alexander Renick, Chillicothe; Nelson W. Strobridge, Cincinnati, and George H. Smith, Chillicothe.

* * *

The Green Bay Barker Company of Green Bay, Wis., recently received its first order for a pulpwood barker from a European country since last June and President Samuel H. Cady of that corporation feels certain that order means a renewal of business relations between some of the foreign countries and his concern. When the European war broke out, business relations were completely severed, and the Green Bay Barker Company was left with a large number of orders unfilled for the reason that shipment could not be made. Three barkers got as far as New York last June and have remained there since. The order called for the shipment of three barkers to Sweden. The order came by cablegram. Another encouraging sign is the fact that a pulp manufacturer in Abo, Russia, has asked to ship a machine contracted for in June by way of Norway, Sweden and Finland; and a manufacturer in Fiume, Austria, has requested that his order given in June be shiped by way of Italy and Hungary. Barkers that were held in New York will be forwarded to the European points.

* * *

With a capital of $80,000 and principal office in Ballston Spa., N.Y., the Ballston Fibre Products Company has incorporated. The company is to manufacture all kinds of box board, container board and their products. Henry J. Meader and Robert Young of Utica, and Clifton V. Barrett of Little Falls, are directors. Mr. Barrett has been conected with the Little Falls Paper Co. at Little Falls, N.Y., for ten years, and during the last seven years as manager. He is prominent in the business and social life of that city.

* * *

The Crown-Willamette Paper Company's new officers at San Francisco, Cal., are being fitted up on the seventh floor of the Alaska Commercial Building, and before February 1 the office forces of the old Willamette Pulp and Paper Company and the Crown Columbia Pulp and Paper Company will have been combined and settled in the new quarters. The various plants of the new corporation are now being operated under one management. Some necessary changes and readjustments will be made from time to time in the interests of economical operation.

* * *

After an illness of only a few days, Nathan C. Ayer, vice-president and director of the Eastern Manufacturing Company, died at his home in Orno, Me., Saturday morning, January 16. Mr. Ayer was the son of F. W. Ayer, president of the Eastern Manufacturing Company, and became associated with his father's firm in 1912. He was born February 23, 1882, and had lived all his life in Bangor until about a year ago, when he purchased the property in Orno, known as the Herrick Farm, and moved there with his family. He was married in June, 1911, to Miss Katherine Holman, of Bangor, who survives him with two children. Mr. Ayer was highly regarded in commercial circles all over Maine and other sections of the country where business interests brought him. Of a genial personality, the charm of which was felt by all whom came in contact with him, he will live long in the memory of his friends.

* * *

The Kraft mill of the Coos Bay Pulp and Paper Company is reported to be running on a full time basis, and is shipping nearly all of its product to Japanese paper mills. The steamer Hazel Dollar recently loaded 1,000 tons of pulp at this plant and proceeded to Japan.

* * *

The Executive Council of the American Paper and Pulp Association, of 18, East Forty-first Street, held a meeting at the Association offices on Friday of last week. Only organization matters were discussed and other business came up in the shape of committee reports, which will be acted upon at the convention to be held at the Waldorf-Astoria, Wednesday and Thursday, February 17 and 18 were taken up at the January meeting of the American Paper and Pulp Association.

* * *

The system of centralizing the American Writing

Paper Company, which has been in the process of preparation for some time, has been completed, and all the main offices of the various mills connected with the company have been transferred to the general office at Holyoke, Mass. It has been announced that the company is now producing at an average of 60 per cent of the normal output.

* * *

S. Elmer Smith, president of the Menasha Paper Company, Menasha, Wis., vice-president of the First National Bank of that city, and ex-president of the Menasha Club, passed away at his apartments in the Hotel Menasha at 8.30 o'clock on January 4, death following a stroke of apoplexy. Mr. Smith had been confined to his room by an attack of sciatic rheumatism during the past five weeks, but appeared well on the road to recovery when stricken by apoplexy. The deceased was born at Caldwell, O., February 22,1862, and had been a resident of Menasha the first twenty years. He is survived by his mother, two brothers, and two sisters. Short services were conducted at the Menasha Club and the remains were taken to Caldwell for interment.

NEW YORK MARKETS

(Special to Pulp and Paper Magazine.)

The groundwood pulp situation has changed during the interval owing to the heavy rainfall in paper making districts and to an early thaw. Plentiful water supplies have eased the demand for this grade of pulp and the price has weakened to some extent. Grinders are hopeful of a good year as conditions are, in general, very favourable compared with the conditions surrounding the same market at this time last year, when, it is said, there were 100,000 tons of groundwood on hand at all points. This year there is practically none on hand. Most grinders are well sold out until the late spring. The prevailing price at present for a strictly No. 1 is about $17 at the groundwood mill.

There has been no change in the sulphite situation. All grades have been in poor demand and the price has had a weak tone. Kraft pulp is rather scarce and the demand is quiet but prices are firm.

There is a better demand for rags and prices are seeking a higher level. There are rather small supplies in the warerooms of dealers and it is said that the market will be firm and higher in the near future. Foreign grades are scarce and in poor demand. Bagging is weaker than at any time in the past year Gunny has reached a level that is within the grasp of papermakers as the present quotation is about 1.20 a pound.

The market for old waste papers has been dull and featureless. Prices in all grades are very weak. Mixed papers are in a demoralized condition. The present value is about 20 cents a hundred weight or less. Flat stock has been in fair demand and is about the only grade that has shown any strength. Old newspapers are very low and are in poor demand. Shippers are losing money on their deliveries of these grades. Shavings have been in poor demand but the price has been upheld because they are scarce.

Pulps.

Ground Wood, No. 1, $20 to $25.50, delivered.
Ground Wood, No. 2, $17.50 to $20, delivered.
Unbleached Sulphite, dom., 2⅛ to 2½, delivered.
Unbleached Sulphite, imptd., 1.90c to 2.10c, ex dock, New York.
Bleached Sulphite, domestic, 3.35c, delivered.
Bleached Sulphite, impt., 2.80c to 2.90c, ex dock, N.Y.
Easy Bleaching, impt., 2.10c to 2.20c, ex dock, N.Y.
Unbleached sulphate, impt., 2.00c to 2.15c, ex dock N.Y.
Bleached sulphate, impt., 2.80c to 3.00c, ex dock, N.Y.
Kraft Pulp, 1.95c to 2.15c, ex dock, New York.

The demand for all grades of paper has been hampered by the slow revival of business in general in this city and country. News paper has been in good demand owing to the increase in advertising of a special nature. How long this boon will last is doubtful. Sheets have been in very good demand and the price has been firmly maintained by all manufacturers. The last mill price was given as 2.20 cents a pound at the mill. Side runs have shown a very weak range in the interval. The price of all grades of manila and fibre papers has weakened considerably and a number of mills have been reported to have made offers to the jobbing trade at practically buyers' prices. The tissue market has been dull for several weeks and the last week was characterized by a falling off in prices of nearly five cents a ream in whites. Manufacturers of writing and bond papers reported that there was a little better feeling in the trade and that there was a small increase in he demand for these grades at their present prices, although the jobbing trade was inclined to hold out for cuts in the prices that were advanced last September. There is no liklihood of a cut as mills are aware that jobbers' stocks are low at present. The bag market has been firm and demand has increased to some extent. Boards have been cut to pieces in both the Eastern and Western markets. Newsboard has been quoted as low as $18 a ton at Chicago and about $23 at New York. Other grades are correspondingly weak.

Paper.

Quotations unchanged for all grades of paper:—

News, rolls, transient business, $1.95 to $2.05 f.o.b
News, rolls, contract renewals, $2.05, f.o.b.
News, side runs, 2.25, f.o.b. New York.
News, sheets, 2.30, f.o.b. New York.
News, sheets, 2.35, f.o.b. New York.
Book papers, car lots, M.F.S., $3.75 to $3.90 f.o.b.
Writing paper, superfine, 13¾c to 17c, del. east of Miss. River.
Writing paper, extra fine, 11c del. east Miss R.
Writing paper, No. 1, fine, 9c, del. east Miss. River.
Writing paper, No. 2, fine, 8c del. east Miss. River.
Writing paper, engine sized, 4½c to 8c, east Miss. R.
Bond paper, 5c to 24c, delivered east of Miss. R.
Ledger paper, 8c to 30c, delivered east of Miss. River.
Linen paper, 7c to 18c, delivered east of Miss. River.
Manila jute, 5¼c to 5½c, delivered.
Manila, wood, 2.65c to 3.25c, delivered.
Kraft, No. 1, $3.65 to $4.00 f.o.b. New York.
Kraft, No. 2, $3.35 to $3.60 f.o.b. New York.
Boxboards, news, $27 per ton, delivered.
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The War

A great part of the world has been grievously disappointed in the hope early expressed when the war began that the conflict soon would end. The estimate of three months, four or six months is passing rapidly from the minds of all serious people and we are fortifying ourselves for a long period of severe times.

As has been urged on several occasions through the coloums of this Journal now is the time when every Canadian must grapple strenuously with these conditions. We can gain by production to an increased extent and we can gain by having the heart to face the circumstances.

But the prospect however distant it may be is still bright and there is no reason for anyone to lose heart. Not only are the arms of the Allies having great success on the Continent, but in the commercial world the Empire is standing together and everything looks towards the maintainence of commercial progress which has long been the pride of the Anglo-Saxon race.

Despite the pessimism of the military authorities there is a strong tendency among the financial men to believe that economic considerations will bring an end to the struggle in the course of the present year. The German Government's act in confiscating food supplies in the country has brought the British Government to declare that all food supplies going into Germany are necessarily Government supplies and as such are contraband of war. The crop in Germany is not likely to be harvested to any great extent in the fall even though the sowing is accomplished this spring, and if the German losses in men continue to be as great as at present there can be but one outcome to the conflict, and that a speedy one.

In Canada there have been recently signs of restoration of old conditions. The steel industry has picked up, and only last week one of the large steel corporations in Canada restored full wages to its employees whose income had been cut 25 per cent during the course of the summer. The public in the United States is joining with the financial authorities and the press in believing that prosperity will come to the United States as a result of the war, and that when the set-back, which must come from the necessity of paying for the terrible losses does arrive, it will be spread over a considerable period and not come too harshly upon America. In view of all these circumstances Canada can undoubtedly be comforted even in the midst of her losses. Times will be hard but they will improve.

The Invention of Mechanical Pulp

In this issue of the Pulp & Paper Magazine is presented the view of a writer who has investigated very closely the facts concerning the invention of mechanical woodpulp. Acording to him there is very little doubt left in the minds of those who have given the matter considerable thought that to a Canadian who lived in the vicinity of Halifax, Nova Scotia, belongs the honor for the working out of this wonderful process which has been the basis of the great part of the modern pulp industry and the prosperity of that marvellous institution, the modern newspaper.

There was a considerable time in the history of Canada when the consumption of newsprint amounted to less than twenty-five tons a day. Men are still with us who can recollect the difficulties which stood in the way of the publication of the newspapers before modern processes revoltionized affairs. Without ground wood we should not know of the 'Sunday Edition' the numerous pages of fashion, comics, sports, society and all the other types of literature which appear in the large newspapers of to-day and would be appearing to an increased extent at this moment were it not for the fact that the great war abroad has shown hat such things are not wholly necessary to the life of the world when under the shadow of an international calamity.

These however are but the luxurious part of the modern newspaper. The press of to-day wields an influence unequalled by almost any other influence. In fact the question has been frequently debated whether the modern pulpit or the modern paper has the greater power. All the power of modern civilization, the marvellous intercourse and interchange of ideas would never be possible but for the universality of that practical necessity—the daily paper.

Even into the trenches at the thickest part of the present bloody struggle in Europe the newspaper is to be found, edited and produced by men under the hardest circumstances. That the newspaper should have such power and that it should be so beloved and so essential a part of the life of to-day is tribute indeed to the importance of the invention which has given rise to it. Mechanical pulp, the mainstay of the presses, preforms functions without number in everyday life. It is hardly necessary to mention all the forms of paper, sheathing, board, etc., which tend to make life liveable, which owe their being to the simple process of grinding up the stems of trees.

To the man who invented mechanical pulp there is therefore great honor due and if it can be proven, as the writer in the Magazine to-day endeavors to prove, that the inventor was one of our own people, every effort should be made to place among the pages of Canada's history, in some suitable and unmistakable form, a tribute to this man whose genius has done so much for Canada and the Empire. It would indeed be not too much, if the case can be thoroughly proven, that the people of Canada should erect a tablet or a monument to the honor of Charles Fenerty, Halifax.

Where Do We Stand?

If there is one condition in Canada which has been emphasized by the recent derangement of financial and economic conditions, it is that in the Dominion today there is very little in the way of statistical information for the use of manufacturers and financiers.

One has only to cast eyes across the water to the older continental countries to see how intricate and refined the statistical bureaus and services can be made. Were it not for the accurate information which is at the disposal of the European countries at the present time, the difficulties of the war woul be enhanced to an extent which we in America can hardly imagine. Financial journals by the score have been investigating and compiling for generations. Government bureaus have been carefully collecting data concerning all phases of national and international life. When it comes to taking a census of the country, Britain's errors are infinitesimal. On the other hand we in Canada know right well that the enormous difficulties facing the census colectors have not been overcome by sentiment on the part of the people nor is there appropriation sufficient to carry out the work successfully.

The Department of Labor in Otawa is dong wonderful work in the collection of statistics on the subject of wholesale prices. Unfortunately the same attention has not been given in all other departments to statistics which bear directly upon the everyday life of the Canadian public. The cost of goods, as they come from the wholesaler may be a very good indication of some tendencies, but it by no means covers the ground which should be covered by a national bureau of some kind. Cost of money, cost of land, and cost of labor as represented by interest on all classes of investments, rents and wage schedules, have not yet been thoroughly investigated. In a hundred ways the central government as a whole has not the speed exhibited by some departments in collecting data.

The present time is eminently opportune for action upon the suggestion which forms the central point of the recommendations of the Department Commission on the Official Statistics of Canada which reported to the Minister of Trade and Commerce on November 30th, 1912, namely, that under fresh legislation or an amendment to the Census and Statistics Acts, there should be created a Central Statistical Office to organize in co-operation with the several departments concerned strictly statistical work to be undertaken by the Dominion Government. Particularly the Commission suggests that in the first instance the office should formulate a complete system of Canadian statistics, using as a basis from the standpoint of subject-matter an elaborate, yet thorough plan prefixed to their report. "More minute examination of the field will be necessary than that which the Commission have been able to give; and there must especially be borne in mind the additional object of determining the agencies best qualified to cover the several sub-divisions and the precise manner in which the data of each subdivision shall be collected, compiled and published. Though the Office should itself constitute the main statistical agency for the Dominion, it is essential that statistics should in every case be collected and analysed by those who have a full and expert knowledge of the phenomena they illustrate."

FORMULAE FOR THE PRODUCTION OF PAPER MACHINES

By EDWARD J. TRIMBEY, M.E.

(Written Specially for Pulp and Paper Magazine.)

Theory cannot take the place of practice, but practice alone can advance neither a man nor an industry as far as they might go if the practice were directed by a reasonable amount of theory.

One of the theoretical considerations which may help to increase profits in some cases by showing that the actual production is considerably less than it might be, is the "Ideal Production" of the paper machine. As the name implies, the Ideal Production is the amount of paper which would be made under ideal conditions with no breaks and no lost time for repairs or washing or changing clothing. That such conditions would be "ideal" no one who works around a paper mill will deny. Of course this never happens in practice, but allowing a certain percent deduction from this amount for lost time and for "broke" we can arrive at a value for the daily production which it is fair to assume should be reached by the machine at any given speed, weight of sheet, and width of trim.

If a deduction of 5% is allowed for time lost in washing and changing clothing and making minor repairs, and 10% of the remaining time for "broke" we will have what may fairly be called the "Normal Production" of the machine. In the case of a machine making specialties, or where the changes are frequent 5% is not enough to allow for lost time, but where a machine is running on one grade of paper this is a fair allowance.

The formulae for "Ideal Production" are:

W x B x S x 0.00167=pounds per hour ......(1)
or W x B x S x 0.00002=tons per day. (2)

and for "Normal Production":

W x B x S x 0.00142=pounds per hour . (3)
or W x B x S x 0.0000171=tons per day . . .(4)

in which

W=the average width of the trimmed sheet in inches as it goes to the winder.

B=the average weight per ream on the 24"x36"x500 basis as determined by weighing samples at regular intervals.

S=the average speed in feet per minute at the calender end.

In the case of wrapping papers where the weight per ream is the weight of 480 sheets instead of 500 sheets the constants in above formulae should be: 0.00174 in (1), 0.0000208 in (2), 0.00148 in (3), and 0.0000178 in (4).

The constants used in obtaining the "Normal Production" are such as to allow 5% lost time and 10% of "broke" during the remaining 95% of the time.

It is a simple matter to apply these formulae in the case of a machine running at a fairly uniform speed and width of sheet, and where the only variations in the weight per ream are the unavoidable variations due to changes in the consistency of the stock or to fluctuations in the speed of the engine, etc., as under such conditions no appreciable error is introduced if the value for "B" is found by adding the weights of the samples from the various reels tested and dividing the sum by the number tested; but when the formulae are applied to a machine where the weight per ream varies greatly at different times during the day the average weight per ream cannot be found in this way as will be seen from the following example:

Assume that a machine is run for 12 hours at 200 feet per minute making a sheet weighing 60 pounds per ream of 500 sheets 24" x 36", and trimming 120 inches wide, and that for the next 12 hours it is run at 60 feet per minute but making a sheet of 200 pounds per ream on the same basis and of the same width as before.

Applying the above formulae for the "Ideal Production" in tons per day we have ½ (120 x 60 x 200 x 0.00002) = 14.4 tons for one half day under the first conditions, and ½ (120 x 200x60 x zero 00002) = 14.4 tons for the second half day under the second conditions, or a total production for the 24 hours of 28.8 tons.

If now we take the arithmetical mean of the two speeds as the average speed, and the arithmetical mean of the two weights per ream as the average weight per ream and substitute these values in the same formula as before, we will have:

120 x 130 x 130 x 0.00002=40.56 tons for 24 hours,

or about 40% more than the true amount.

It does not often happen that there is such a wide variation in weight as in this assumed case where the error introduced in this way is great enough to be easily detected, but where the weight per ream varies by about 25% the error would still be considerable yet might not attract attention.

It generally happens that not only the speed and weight basis change but that the width of the sheet is changed at the same time, and the runs under given conditions are for variable lengths of time.

The formulae given above for "Ideal" and for "Normal" production will give correct results for any number of sets of conditions if the true average values for "W," "B," and "S" are used, but the true averages for these quantities are not the arithmetical means, as we have seen.

To obtain the average speed it is necessary to take into account the relative lengths of time at the different speeds. The average width is dependent upon the relative times and speeds at the different widths, and the average weight per ream depends upon the time, speed and width for each of the different weights run.

If we designate the time in hours the machine is run on the different orders by H_1, H_2, etc., the speeds by S_1, S_2, etc., the weights per ream by B_1, B_2, etc., and the widths in inches by W_1, W_2, etc., the formulae for the average speed, weight per ream, and width over any period of time when running for various lengths of time at different speeds, weights and widths are as follows:

$$\text{Average speed} = \frac{(H_1 \times S_1) + (H_2 \times S_2)}{H_1 + H_2} \quad \ldots\ldots (5)$$

$$\text{Average width} = \frac{(H_1 \times S_1 \times W_1) + (H_2 \times S_2 \times W_2)}{(H_1 \times S_1) + (H_2 \times S_2)} \quad ..(6)$$

$$\text{Average weight per ream} = \frac{(H_1 \times S_1 \times W_1 \times B_1) + (H_2 \times S_2 \times W_2 \times B_2)}{(H_1 \times S_1 \times W_1) + (H_2 \times S_2 \times W_2)} \quad ..(7)$$

In the example quoted above $H_1 = H_2$ and $W_1 = W_2$ so for average speed, formula (5) would reduce to

$$\frac{S_1 + S_2}{2} = \frac{200 + 60}{2} = 130 \text{ ft. per minute}$$

and for average weight basis, formula (7) would reduce to

$$\frac{(S_1 \times B_1) + (S_2 \times B_2)}{S_1 \times S_2} = \frac{12000 + 12000}{260} = 92.31 \text{ pounds per r'm}$$

These values when substituted in formula (2) for "Ideal Production" in tons per day gives

120 x 92.31 x 130 x 0.00002 = 28.8 tons per day.

THE INVENTOR OF GROUND WOOD

A Reply to the European Critics.

By "NOVA SCOTIAN"

(Written Specially for Pulp and Paper Magazine)

"Who invented mechanical wood pulp?" asks Mr. Shemas Hall, a writer in the "World's Paper Trade Review" (London), who reminds me of the man who replied to a question by asking another one. The question to be solved is not a difficult one, as the past history of the paper and pulp industries in this part of the world, know that the claim to the invention must be placed at the feet of the late Charles Fenerty, of Sackville, near Bedford Basin, outside Halifax, N.S. The news of Fenerty's discovery is now past history in Halifax, but according to Mr. Hall, it is new history in the United Kingdom, while Germany—and it is questionable if the United States is not in the same category—France, Belgium, and Austro-Hungary, have always looked upon Friedrich Gottlob Keller, of Hainichen, Saxony (Germany), as the original discoverer. Mr. Hall, however, in his recent contribution to the London journal has not advanced the theory that Keller discovered ground wood before Fenerty, neither has he definitely stated that Fenerty made the discovery before Keller. He simply says:—

CHARLES FENERTY,
Born Sackville, N.S., Jan., 1821, died Sackville, N.S., June, 1892.

"I am convinced that, weighing all the facts together—because Fenerty actually produced paper from wood pulp—the two men produced pulp about the same time, and the only setback they received from bringing their names quicker and more prominently before the manufacturing world was discouragement in Fenerty's case and the want of money in Keller's."

In the foregoing sentence Mr. Hall answers the question: "Who invented mechanical wood pulp?"

Now, in case there might be any doubt about Fenerty's claim to the discovery, it is necessary to consider Mr. Hall's contribution and some of the text books on paper and pulp, as well as books produced generally by various authors. When these numerous volumes are perused, it will be found that no argument whatever can be adduced, or, no tangible proof given, that Keller discovered ground wood before Fenerty. Mr. Hall quotes from R. W. Sindall's work, "An Elementary Manual of Paper Technology,' which says that in 1840 Keller introduced the manufacture of mechincal wood pulp. Keller, who was born in 1816 (and died in 1895) would be 24 years of age in 1840, and while other writers place the date between 1840 and 1846, the Germans themselves fix the date at 1843 and 1844. Whom are we to believe? Where did the date 1840 originate? There is no mention of it in pulp or paper history, and we must assume that the date is either 1843 or 1844 that the discovery was first made, which agrees with German views and German writings. Mr. Hall then goes on to say: "'Forestry and Forest Products' (1885), edited by Messrs. Rattray and Mill, informs me that Larange Bull, of Martinique, from 1840 to 1846, made paper pulp from the leaves of the banana tree, but the limited supply prevented its continued use. Keller, a German, invented and took out letters patent in Germany for a wood pulp grinding machine. Want of capital prevented him keeping to himself or licensing his discovery, and he sold the patent to Voelter. Voelter improved certain features of the process, and in 1847 he developed the manufacture and used large quantities of wood for producing paper suitable for newspapers. This system, with slight modifications, is still in use both on the Continent and in America. . . . Souche, the proprietor of a French paper mill, adopted the Keller-Voelter wood grinding process in 1849.' Again, in the 'World's Paper Trade Review' of April 3, 1896, there appears the statement that Keller played a 'most important initial part in the wood pulp industry.' ''

These extracts do not help the case in favor of Keller, because they are not authoritative. Except for "Forestry and Forest Products," which mentions the period 1840 to 1846, it will be noticed that no definite date is given to Keller's invention. This brings me back to the conclusion that the date was somewhere between 1843 and 1846.

However, in order to complete the research work, and once and for ever settle the dispute about Keller being the first with the discovery, I will quote from other volumes that Mr. Hall has ignored. I find that in Carl Hoffmann's work, "A Practical Treatise on the Manufacture of Paper in All its Branches," that author—who was a superintendent in German mills, and associated with mills in the States, where his work was published—says that "F. G. Keller in Saxony originated the idea of grinding wood by pressing blocks of it against a cylinder of sandstone revolving in a vertical position, but Henry Voelter, of Heidenheim, Wurtemburg, took it up and succeded, after 20 years, altering and extensive experimenting, in brining the process to its present perfection. To him belongs the credit of giving us a new material, which, if it does not meet the quality of papers, has through its cheapness been profitable to the manufacturer. . . ." As a matter of fact, the Keller-Voelter grinding process was in working order in 1847, and nine years later, when the fibre body of wood was found as a pulp-producing source, papermakers in Germany, France, and Belgium had additions made to their mills in order to specially prepare the wood pulp. But Hoffmann's date, if we take Mr. Sindall's step with 1840, would bring us up to 1860, before which period Brooman, Martin & Martin, and Kingsland of America had grinding inventions in the field of industry. Consequently we get little help from Hoffmann's work, which contradicts other writers. Another writer, Mr. A. D. Spicer, a well-known paperman in London, in his book on "The Paper Trade," mentions that "A raw material which had always appeared to possess great possibilities was wood. As early as 1800 when Koops published his work on paper, the use of wood pulp was discussed; but at that period it could not be made to compete successfully against rags. It was difficult to obtain anything of more than ephemeral value. We hear that it was introduced into this country about 1871, but this could only have been the wood pulp discovered by a watchmaker, Keller." Now, this is a most remarkable statement, but as nothing definite is contained in it, or no date assigned to Keller's discovery, I dismiss it in favor of Fenerty's claim. Canadians and Nova Scotians will observe that in all these extracts—and, indeed, in all the European text books and volumes I can lay hands on—there is not one mentions the name of Charles Fenerty. Yet, the discovery of ground wood is placed to the credit of Keller—which, incidentally, is contradicted by Mr. Spicer's statement when he says " . . . the use of wood pulp was discussed: but at that period (1800) it could not be made to compete successfully against rags. . ."—and monuments and honors showered upon his memory by Englishmen and Germans, etc., and at the eleventh hour the question is now asked in the "World's Paper Trade Review"—"Who invented mechanical wood pulp? Even Mr. Hall does not fix a date on the discovery, but he goes very near it.

Well, so much for the European text books, and books written on the paper and pulp industries. They do not prove very much to my satisfaction. In Nova Scotia it is a well-known fact that Charles Fenerty made the discovery, and while Keller was thinking out his problems, Fenerty actually produced paper from pulp derived from spruce. There is evidence to-day that he did so, and, in addition, George Mullane, in his "Footprints around and about Bedford Basin," says that the first known experiment of transforming trees into paper was the work of a man who "lived, moved, and had his being" not many miles from the old Dutch church. That man was Fenerty. For the information of the European critics, perhaps it would be as well to state a few facts in regard to Fenerty's life, coupled with those adduced by Mr. Hall. Fenerty was born in Springfield, in Upper Sackville, Halifax, County, Nova Scotia in 1821 and died in Middle Sackville on June 13th, 1892, at the age of 71 years. He was somewhat interested in farming and lumbering, but being of a literary nature his love lay in books. His parents having a good deal of business in the lumbering industry, Fenerty at an early age soon became acquainted with the different qualities of timber in the forest. Now Keller had not the same opportunity as Fenerty had and it stands to reason that when the two are compared for knowledge in forestry, Fenerty stands out pre-eminently as the superior. What is more to his credit, Fenerty was the better educated—I mention this fact because of his studious nature, and his power of observation, qualities which played a prominent part in his efforts to produce paper from spruce and poplar. Having a close connection with the forests Fenerty also had the opportunity of studying from his boyhood days the manufacture of paper. Lying between his birth place, Springfield, and Halifax, was a paper mill driven by a stream that empties itself into Bedford Basin, at which rags were used as the raw material. Fenerty was constantly seen about this mill as he was studying and observing the mode of operation, in addition to ascertaining if it were possible to introduce the properties of spruce and poplar fibres as materials for paper-making. At this period he was only 18 years of age.

His experiments, as he soon knew, resulted in success and there is evidence of it in existence to-day, one being a letter addressed to Messrs. English and Blackader, now Macfarlane Bros., of Halifax, and quoted by Mr. Hall, which says:

"Gentlemen,—Enclosed is a small piece of paper, the result of an experiment I have made, in order to ascertain if that useful article might not be manufactured from wood. The result has proved that opinion to be correct, for—by the sample which I have sent you, gentlemen, you will perceive the feasibility of it. The enclosed, which is as firm in its texture as white, and to all appearance as durable as the common wrapping paper made from hemp, cotton, or the ordinary materials of manufacture, is actually composed of spruce wood, reduced to a pulp, and subjected to the same treatment as paper is in course of being made, only with this exception, viz.: my insufficient means of giving it the required pressure. I entertain an opinion that our common forest trees, either hard or soft wood, but more especially the fir, spruce or poplar, on account of the fibrous quality of their wood, might easily be reduced by a chafing machine, and manufactured into paper of the finest kind. This opinion, sirs, I think the experiment will justify, and leaving it to be prosecuted further by the scientific or the curious, I remain, gentlemen, your obedient servant, Charles Fenerty.''

The foregoing letter is dated 1844. It is an example of what Fenerty had achieved and exhibits his scholarly pen and his knowledge of paper-making. But this is not the only sample of paper Fenerty produced, because he was experimenting from 1839 onwards. In 1840 and 1841 he actually produced paper from spruce pulp, and there is evidence to prove so to-day in Halifax. His knowledge was of a scientific character, and there is no proof in either Germany or England to show that Keller in 1840 and 1841 actually presented for public inspection a sheet of paper produced from ground wood. Therefore, the credit of the discovery lies with Fenerty, and not with Keller. To go further, the Halifax ''Acadian Recorder'' in 1844 said, when Fenerty announced the results of his experiments to them, that the credit of the invention was due to Fenerty. But the ''Acadian Recorder'' was not aware that Fenerty had sent in his sample of paper three or four years after the discovery.

Being an out-and-out student, it is not definitely known whether Fenerty made paper from ground wood as a mere pastime, or for the purpose of opening up a new industrial career. In any case, Halifax has lost by not taking up the discovery one of the finest opportunities of promoting a first-class industry ever any town in Nova Scotia or Canada had experienced. If it had been taken up, Halifax to-day would have been the centre for ground wood production and ground wood machinery. The ''Halifax Herald'' at the time said: ''Surely patriotism alone ought to move some influential persons to exert themselves in rescuing the claims of a young Nova Scotian to such merit from oblivion.'' No! Halifax was too enraptured in producing dollars from lumber and from the tilling of the land. And so Fenerty perished; but his memory is still cherished as the first inventor of ground wood. He takes precedence before anybody else in the matter. Indeed, the evidence in Keller's case is so contradictory that it is difficult to say if he made paper from pulp at all. The Germans, howeevr, says that the ground wood was discovered in 1843—and they ought to know better than anyone. This leaves Keller at the least three years behind Fenerty.

Mr. Hall pays a tribute to Fenerty. He says Fenerty was ''a genius.'' That tribute ably shows up the character of the man. He was an inventor of the first water, a poet, and a writer for the newspapers, in addition to having a fair knowledge of farming, lumbering, and paper-making. It is true that he took a trip to Australia and had a fair measure of success in the gold fields, and afterwards joined an expedition. He wrote:
''Then 'tis sinful to sigh for the joys that are gone:
They were earthborn, untrue, evanescent;
And teach us this lesson, ere yet it is flown:
For the future prepare by the present.''

These lines were penned at Sackville amidst his paper-making studies. They depict the ''genius''—the developed mind and the scholarly pen.

Some years ago a movement was started to erect a tablet or something of the kind in Halifax to Fenerty's memory, but the scheme fell through. Germany has erected a monument to Keller's memory. Is it not possible for Nova Scotia and Canada to set up a small tablet somewhere to record that Fenerty was the original discoverer of ground wood, and pay a tribute to his abilities. It is time the world heard about him, and not let all the credit of the discovery go to Saxony. Because Halifax did not appreciate its inventor in 1839 to 1844, there is no reason why we should not appreciate and perpetuate his memory now. His poems and writings are still with us. If his discovery is questioned in the 20th century by ''critics'' who have never heard of the name of Fenerty, who is there to be left—and what tangible evidence will they have to adduce—to defend him and his discovery in the next half century?

JUST ONE CONDITION.

(Toronto World, December 18th, 1914.)

Here's another little story of the ''scrap of paper'' variety. And it contains a profound principle.

Not many days ago the presses of a large printing firm in Toronto were ready to start running on a big order of booklets. It was a good hopeful job indicating that the firm whose name was on the front page—for the story's sake, we'll call it Hobbs and Johnson—expected to adhere to the motto ''Business as Usual.'' An increase on the last order; same cheerful announcement of what was doing—and what was just as important—the very best kind of paper to be used in the printing.

''Nothing cheap about that firm, Bill'' said the pressman to the foreman.

''Stock's real nifty, Tom. Hope you got a good make-ready on the press?''

''Oh sure. She's all right. Let her go—'' Telephone buzzed in the booth. Foreman went.

''Hello—this is Hobbs and Johnson.''

''Yes sir, about that booklet run? It's on the press now.''

''What kind of paper are you using?''

''Why, very best of—'' mentioning a name familiar to users of high grade paper.

''Hum-Hum! I see. Well I guess that's all right. But I don't care what fancy name you give the stuff. All I wanted to make sure about was—'' (Here the speaker biffed his speech right into the mouthpiece.) ''Was that paper made-in-Canada? If not, take it off the press. If so, go ahead. If you haven't made-in-Canada paper, phone me and I'll give you the address of a Canadian firm that makes the kind of paper I want. I want that job to be made-in-Canada clean through.''

And sure enough the job had to be taken off the press!

The Pulp and Paper Magazine has inquiry from an agency in Italy wishing to represent firms manufacturing dry mechanical pulp and dry extra strong sulphite pulp.

THE MUNTZING WOOD PULP DIGESTER

J. GUSTAV V. LANG in "Paper."

The production of chemical woodpulp is based on the principle of dissolving the binding material, lignin, etc., which holds the cellulose fibers together in the wood, by boiling the wood at suitable pressure and temperature in alkaline or acid solutions of different composition, according to the process employed, the three principle processes employed being the soda, the sulphate and the sulphite.

As a rule the wood is chopped up after the bark has been removed, often it is still further disintegrated in a crushing or grinding apparatus. Then the knotty parts are removed and the remainder is placed in large boilers termed digesters. The solution is let in, the digesters are hermetically sealed, and steam is forced in under pressure. In this way the wood is boiled for a considerable period of time before all the cellulose becomes liberated.

But while the boiling process goes on the solution becomes more and more diluted by the moisture contained in the wood and by the steam. At the same time its concentration is reduced by the chemical action on the binding materials, the lignin, and even the cellulose itself. To insure sufficient concentration at the end of the boiling process, it is therefore necessary to use a solution which at the start is of a relatively high concentration, far higher than is really necessary for a normal and satisfactory dissolving action.

Furthermore it is often difficult to avoid getting hard and soft woods mixed together, or wet and dry wood. The solution must then be given a sufficient concentration for the more hardboiled wood, and the result is that the relatively quickly-liberated cellulose fibers of the more easily digested wood will be subjected to the action of the solution for a considerable period of time while the other wood is being digested.

Because of the high concentration of the alkaline or acid solution, as well as of the relatively longer time during which the liberated cellulose fibers are subjected to the alkali or acid, a not inconsiderable portion of the cellulose becomes dissolved and a still larger amount becomes affected so as to lose the toughness and strength inherent in the healthy and unaltered cellulose fiber. This chemical action on the cellulose entails not only a loss in cellulose output and in quality of the product but also a certain waste of chemicals.

Considerations like the foregoing led A. Muntzing, long the head of Munksjo Pappersbruk, the originator of kraft paper and pulp, and the recognized paper and pulp expert, to develop his new method of boiling woodpulp—the Muntzing method. The principle of the Muntzing method is the constant circulation of the solution, whereby all the liberated cellulose fibers are carried along and deposited in suitable fiber separators, which either are of the filter press type, and then alternately connected to the circulation system and alternately emptied of deposited cellulose, or are constructed for continuous operation and automatic continuous emptying.

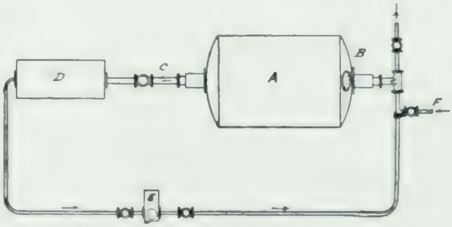
In the Muntzing process it is not necessary to chop up the wood, and it has been found that even the knots give no trouble, but are completely disintegrated, so that a knot separator which had originally been provided was shown in practical working to be unnecessary.

The Muntzing Digester.

The Muntzing digester consists of a horizontal cylinder with nearly flat, somewhat bulged ends. This digester is kept rotating around the axis of the cylinder so as to keep the stocks or wood pieces rubbing against each other. To insure the turning of the stocks the inner surface of the cylinder is provided with projections which prevent the wood from simply sliding against the inner surface of the digester. Near each end of the digester a perforated retaining plate is arranged, the object of which is to prevent the clogging of the circulation openings and of the steam inlet of the solution stand glass, of the manometer, etc. The circulation and the steam must naturally pass through the axles of the digester.

The Circulation.

The circulation is maintained by a suitable pump which may be either of the plunger type or the centrifugal type and of sufficient size to maintain a flow of 200 gallons a minute. Flow indicators are provided to permit of a constant watch on the circulation.



OPERATION OF THE MUNTZING DIGESTER.

The cylindrical digester A rotates on rollers or taps. B is a manhole for charging the digester with raw material. At the ends of the digester, perforated plates are provided to keep the raw material away from the intake and outtake of the circulation system. After the digester has been filled with raw material, the solution is let in until it reaches about the center; steam is now turned on and the digester is slowly started to rotate. When the pressure has reached the proper point fibers begin to be liberated on the surfaces of the stocks or pieces of wood, and as the wood pieces during the rotation are rubbing against each other the fibers are loosened by the friction so that they float around freely in the solution. Then the circulation pump E is started, whereby the solution is forced to pass out through the hollow tap C at one end of digester, to the filter press D, where the liberated cellulose fibers are separated from the solution, which latter continues through the circulation system, i.e., the pipes and the pump E back to the digester, through the tap at the opposite end. As soon as the filter press is filled, which can be determined from indications on pressure gauges or circulation indicators, the circulation is diverted into another fiber separator and the filled one is emptied. Fresh liquid must be added from time to time and is introduced through the pipe F by means of a suitable pressure pump or injector, and the concentration can thus be regulated exactly at will and be kept constant at just the [illegible]

The Fiber Separator.

From the digester the circulation continues into and through the fiber separator. With an apparatus of the filter press type, the separator consists of a cylindrical mantle closed permanently at one end and having a removable cover at the other end. This cover is hollow. Mounted on it and projecting from it in the direction of the cylinder axis, a number of large flat pockets are arranged vertically the sides of which are finely perforated. These pockets stand side by side about six inches apart, their insides being connected to the hollow of the end cover. The stream of solution coming from the digester enters the fiber separator through the cylindrical mantle near the permanently closed end. It is thus forced to pass through the perforated sides of the pockets and so cause the fibers to be deposited between the pockets while the solution circulates through the hollow end cover out into the pipe system leading to the circulation pump, which forces it back into the digester to again act on the wood and to carry away a further quantity of fibres that have been set free by the digesting process.

As soon as one filter press is filled with cellulose fibers, the circulation is diverted into another filter press. The small amount of solution which remains in the disconnected filter press is then forced out by simply opening a connection between it and a special tank. As this is open to the atmosphere, and the internal pressure in the filter press about equals that in the digester, the solution is forced into the tank by this pressure.

The endplate with the pockets mounted thereon is then removed from the cylindrical mantle. The pulp collected between the pockets will then fall out, assisted, when necessary, by a stream of water. The removable part is put in place again and clamped tight. The filter press is ready again to take the place of the other press while it is being emptied.

The continuous fiber separator consists of a conical mantle, the small end of which has a conical bore about a third of the total length, the remainder being cast hollow with an inner diameter larger than the maximum diameter of the conical bore, had it been extended the whole length of the mantle. Such a continuation of the conical bore is provided in the form of a perforated cone which is mounted inside the mantle. Enveloping the perforated cone is an annular space connected to the circulation system. The inside of the cone is equipped with a screw, also conical, and to the large end of this screw is led the circulation stream of liquor. The solution passes through the perforations to the annular space and from there it goes through the circulation pump back to the digester. The cellulose fibers are deposited in the perforated cone and are moved forward by the rotation of the screw, being gradually compressed and squeezed dry thereby. In the nonperforated part of the conical bore the compressed fibers act as a slowly moving plug to counterbalance the pressure inside the fiber separator, which plug is constantly being renewed. Provision is naturally made close to the outlet until a sufficient amount of packed pulp has been collected in the small end of the cone to take care of the pressure.

Continuous Operation.

It is evident that with three or, still better, with four digesters and three filter presses or two of the continuous fibre separators at one's command, it is feasible to maintain a continuous production even with allowance for repairs both of digesters and fibre separators. The circulating pump equipment should preferably be supplied in duplicate.

Maintenance of Solution Level and Concentration.

To keep the digesters properly filled with solution and to replenish loss of liquor at the fibre separators, particularly when the filter press type is employed, it is necessary to have a force pump or some other means of forcing liquor into the circulation system against the high pressure existing in the system. It is advisable to have this apparatus in duplicate. According to the state of concentration of the circulating liquor the loss in quantity can be replenished either from the waste liquor tank, mentioned in connection with the operation of the filter press type of fibre separator, or from the tank for fresh liquor.

Transfer to Other Digester.

Ts soon as the wood supply in the working digester becomes low and the filter press does not fill up in reasonable time, the digester is stopped and the circulation is discontinued. The digester is then connected at its lowest part to another digester already charged with wood. The pressure drives the boiling waste liquor over to the digester about to be started. Any liquor over and above what can be advantageously applied in this digester is driven over to the waste solution tank. There is naturally a limit to the continuous maintenance of concentration of waste liquor, as regards active chemicals, owing to the saturation of the liquid by organic matter. By using part of the waste liquor a considerable saving in heat is effected. After the digester has been emptied of liquor it is filled up with wood so as to be again ready for operation.

No Waste of Chemicals.

It can easily been that by this process no chemicals need be wasted. The principal saving is effected by the condition that no chemicals are needlessly expended in decomposing the cellulose itself. By maintaining the concentration of the waste liquor, as regards active chemicals, and thus using this liquor over and over again so long as organic matter can be held in solution, it is evident that the amount of waste liquor which has to be discarded or passed through recovering processes is minimized, as must also be the loss of chemicals connected therewith.

The Muntzing method is equally applicable to the soda, the sulphate, or the sulphite process.

Quantity and Quality of Product.

In each case more pulp is obtained from the same amount of wood, and it is not a question of a 5 or 10 per cent increase, but from 20 to 30 per cent and even still higher.

The reason is that the loss from the chipping is avoided as well as loss in the disintegrators and sorting screens. The knot waste, which represents a considerable item in the present methods, also disappears by the Muntzing method. Finally and most important, the loss through dissolved cellulose is reduced to a minimum.

In addition to the foregoing advantages, the quality of the pulp is and must be superior, because it does not contain a large percentage of mechanically spoilt fibres or of chemically affected cellulose. This means a more uniform and a stronger fibre. The fact that no chemically affected cellulose is mixed with the pulp is of inestimable value in the manufacture of artificial silk from cellulose, in which branch it has been found that the presence of chemically affected cellulose causes clogging of the squirting apertures and frequent interruptions which entail great loss in time and money.

A most important advantage of the Muntzing method is that a uniform quality of pulp can be obtained even when dry and wet woods, or hard and soft woods are mixed. The product is constantly under control, and it is possible quickly to change the quality by varying the concentration, the pressure, the speed of rotation of the digester, or the rapidity of circulation of the liquor.

Furthermore it has been found that with the Muntzing method a satisfactory pulp can be obtained from woods hitherto considered unfit for cellulose production. Excellent results have been obtained, for example, from dwarf fir, twisted branches, mill waste, etc.

Commercial Installation.

The first application of the Muntzing method on a commercial scale was completed at Wargon paper mill, Wargon, Sweden. This plant has a capacity of about half a ton an hour of sulphate pulp. A number of tests have already been made there and have shown results which are superior even to those made on a smaller scale in laboratory experiments.

In one of these tests where the pulp from fifteen charges of split logs was measured a yield of 1,375 lb. per cord was found. When this result was compared with that obtained at a most modern sulphate mill, the Gutzeit mill, Kotka, Finland, where 1,055 lb. per cord is the best, the Muntzing process shows an improvement of 30 per cent. Another test, made on mill waste, showed a productive capacity of 980 lb. per cord. At the Gutzeit mill 525 lb. per cord is the customary output. At Frovifors mill in Sweden, 620 lb. to 650 lb. per cord is claimed. The increase in output is thus at least 50 per cent by the use of the Muntzing method.

A carefully carried out test was made by a disinterested expert, Berndt Lindqvist, of Fengersfors paper mill. He weighed the total charge of mill scrap, took samples of the wood, and determined the percentage of moisture in the wood. At the end of the boiling period what remained in the digester was taken out and weighed. A determination of the amount of water contained in this residue was made. From these measurements it was found that 3,100 lb. of dry wood had been digested. The pulp obtained was also tested for moisture and when figured as pulp with 90 per cent moisture the quantity obtained corresponded to 1,390 lb.

A comparison with the first mentioned test of mill waste is of interest. If the weight per cord is assumed at 2,100 lb. the ratio will be found to be for all practical purposes the same. In other words, the two tests corroborate each other completely.

Cost of Production.

Since the disintegrating of the wood and even the barking in some cases is avoided by the use of the Muntzing method, a considerable saving in labor and power is effected. In addition to this the saving in chemicals, estimated to from 15 per cent to 20 per cent, is an item. By-products, as turpentine, etc., can be obtained as easily by the use of the Muntzing process as by the ordinary method. Any by-products from waste liquor are likely to be obtained more readily where the Muntzing method is employed because of the greater concentration of the waste liquor as regards organic matters. All these considerations point to a considerable saving in the cost of digesting a certain quantity of wood for the production of cellulose.

Inasmuch as disintegrating machines are not required, the necessary power and space for these and for the additional handling of the wood in its different forms being also disposed with, it is reasonable to maintan that the cost of installation is not greater in the case of the Muntzing method than with an installation of the ordinary type. If anything it should be less.

Aside from any saving in labor, power, chemicals, and otherwise, the fact of an increased yield of, say, 25 per cent would warrant any mill changing its equipment. Half of the increase in revenue would more than suffice to pay interest and depreciation on the new capital, and thus a net saving of at least $5 a ton of present output would result from such a change.

TECHNICAL EDUCATION IN CANADA

Address by RHYS D. FAIRBAIRN, Before the Canadian Commission of Conservation.

The Ontario Association for the Promotion of Technical Education was organized in April, 1914, in response to the opinion expressed at a meeting in Toronto of men and women, representing Provincial Associations. To-day we have in one representative body united for the advancement of Technical Education the following: Trades and Labor Council, The Canadian Manufacturers' Association, National Council of Women, Clay Workers' Association, Retail Merchants Association, The Ontario Associated Boards of Trade, The Ontario Library Association, Ontario Women's Institutes, The Association of Architects, The Toronto Board of Trade, The Toronto Advertising Club, The Local Council of Women of Toronto.

This is the first Ontario Association which has brought together so large a membership of influential Associations, with one object in common. This will in some measure explain to you how important this movement is, and the general interest which is taken by these various Associations. What is required now is a further education of the general public of the advantages to Canada, and our young people of technical education.

As stated in the Constitution, "The object of this Association shall be to bring to public attention the importance of industrial education as a factor in the industrial and educational development of Ontario, to provide opportunities for the study and discussion of the various phases of this problem, and to make available the results of experience in the field of industrial education."

We emphasize our object by the name of the Association, "Promotion of Technical Education," and in using the word "Technical" we use the broadest meaning, which includes agriculture. We must always impress upon our people agriculture and manufacturing must be developed jointly to make Canada a great nation, [illegible] farmers.

One of the great lessons of this present war has been to show the difficulties of nations who are more or less depending on other nations for either food stuffs, or manufactured products. The more evenly balanced the production of a country is, the stronger that country. The first aim of every person in Canada, should be to make this country one of the powerful, prosperous and happy nations within the British Empire, working for peace and good will among men.

The Ontario Government with its technical education policy has made our work possible. The report by Dr. John Seath on "Education for Industrial Purposes" 1911 has been the lead for the whole province. It is a clear practical outline of possibilities.

As a result of their recent legislation we have already in Ontario between 30 or 40 centres where industrial training is given. This is largely given in night classes, only six centres which have day classes.

The Minister of Education, Honorable Dr. Pyne, has by advice and personal attendance at our meetings encouraged our work very much.

I speak more particularly of the province of Ontario because our association is a provincial one, but it will be well to point out that the great activity of all provinces. The province of Nova Scotia was about the first to take practical steps to give their people this training. The Province of Quebec has been quite progressive with their two large schools built by the Government in Montreal and Quebec. Manitoba has also done good work, two schools in Winnipeg. British Columbia is very active to-day, and Alberta's new regulations come into force the first of February, and Saskatchewan is well to the front, also New Brunswick. There is a welcome everywhere for our work.

Of the work of our association we have already held two public conventions where public men and prominent Educationalists have addressed the meetings. In this way the work has been given great publicity through the Press.

Then we have undertaken a popular lecture campaign, an outline of which is attached to this report. The first lecture under this plan was given in Pembroke this month, when Dr. Putman of Ottawa was the speaker. As President of this Association, I also had the pleasure of being present. The meeting was a success, and those interested are sure it will be productive of good results.

We have made representation to the Dominion Government for financial aid along similar lines to that as already granted for the Burrell Bill for agriculture, but as war was declared shortly after our interview, the question was temporary abandoned.

Our secretary, Mr. Thos. Bengough, has undertaken the publication of a journal devoted to technical education under the name of "Training." This is a business venture of his own, but it is used by our association as our official organ.

We hope to press for the introduction of a course of agriculture in our city and town high schools, to give an outlet from the city and town to the farm. In the case of Ontario our aim would be to have our courses so regulated as to become feeders for our Guelph agriculture college.

One other matter of importance to-day which we find essential in Ontario to the development of proper technical education is the placing of manual training and domestic science of the public school system under the "Advisory Industrial Committee" thus placing our great public school system in complete working harmony with the technical schools.

Last May our secretary addressed a large body of prominent men in Montreal with the hope of forming another similar organization in the Province of Quebec. This so far has not been productive of results. and it is here that we want the aid of the Conservation Commission, to carry forward the educational work.

Sir Clifford Sifton at your annual meeting in January, 1914, said: "Our duty is to investigate, enquire, advise, and inform. We should never carry the work which might be considered departmental further than necessary to arouse interest in it, point the way to improvement, and in some cases to collect the information necessary to the formation of intelligent judgment

The Conservation Commission has been studying, investigating and working in conection with—

1. Agriculture—especially illustration farms and neighborhood associations.
2. Forestry—prevention of fires and conservation of timber.
3. Fisheries—oysters, lobsters, etc.
4. Fur Farming—the development of this new industry.
5. Public Health—including Town Planning, etc.

"In the last resort, the highest degree of Conservation depends upon the efficiency of the human unit."

"The greatest need of Canada to-day, from the standpoint of its material development, is a higher degree of agricultural and technical education. That we have not excelled in this respect in the past, except in certain branches, has been due to the fact that attention has not been directed to these subjects for a sufficiently great length of time to permit of the development of bodies of trained experts."

This is true, and it is quite clear from these statements, the Conservation Commission would only be carrying out their own plan to add technical education to its active work for this and for the next few years.

The Ontario Association for the Promotion of Technical Education, does not carry its work beyond "Promotion" nor do we do any work which is of the Education Department.

To be practical, would it not be possible to form similar or other organizations in the Maritime Provinces, Quebec, Manitoba, Saskatchewan, Alberta and British Columbia with the Conservation Commission as a central guiding head?

To effectively carry out a proper plan it would require about $5,000 per annum for organization work, and afterwards a considerably larger amount for lecturers to aid these various provinces. This would be entirely aside from the larger question of Federal Aid to all provinces for actual work being done.

As to the need of an educational propaganda there are probably 100,000 boys and girls of an age from 14 to 16 years who every year enter some trade such as manufacturing, agriculture, mining, or transportation. Our present general scheme of Education is not for these masses, but for the classes, and from every source of information. we learn that the old apprentice has passed, so now education must take its place.

With the high cost of living, we should give these young men and women a chance to earn a high wage, and as a manufacturer we know that trained workers at a high pay are vastly cheaper than the cheap unskilled employees.

In the time of war prepare for peace. It is beyond question that this is true at the present time.

There is only one way to successfully make our future in Canada, and that is the large expenditure of money, by the nation, for education along technical and agriculture lines, except only this war there is no other question before the people of Canada to-day of so great importance. It is vital to our progress to have our young men and women properly trained. We see to-day orders placed in other countries which should come here, and for no other reason than the fact that our people have not the proper training to produce the work. It is not a question of capital or the lack of it, on the part of our manufacturers or banks, but it is a question of not having sufficient skilled help.

Ontario is probably as much alive to its importance as any other province.

The City of Toronto will open its new Technical School next September, which will be one of the best schools of its type on the continent, and is adapted to the city requirements. In fact, I may add that we expect it will be used as a University by the towns outside of Toronto, a great many students taking their degree from this central school. The citizens of Toronto spent the large sums of $2,000,000 for this one building, site and equipment, nor are they satisfied with this, but we have already purchased three sites for branch schools.

We would like to point out the special attention which is given to the training of girls as well as boys. All the branches of women's work have had careful consideration, particularly Household Science.

It is considered that the health of the body is quite as important as training of the mind.

In the city of Toronto we are now working on the plan of taking care of children of weaker mentality. This we claim will aid our whole technical system.

To properly take our place in the commercial world, Canada must have every town and every province fully alive to the benefits of technical and agricultural education to utilize to the utmost our boundless resources.

Of the successful issue of this war, we do not doubt, and following it we will see just as great a development in Canada as we will be able to take care of.

Trade conditions are much better to-day than they were last September, and will continue to improve. Let Canada prepare herself educationally to take her fair share in Nature's blessings.

Prompt action is of vital importance now during the war, and we sincerely trust the Conservation Commission will accept our statement in good part. If we press too hard, it is because we have studied conditions, and know the great need for Canada's future.

St. Lawrence Pulp and Lumber Corporation

The Canada Lumberman's representative has been down to see the new plant of the St. Lawrence Pulp and Lumber Corporation, and has this to say of the pulp equipment:

The pulp mill is by far the largest portion of the plant and will have a capacity of from 100 to 110 tons of sulphite pulp per day. Starting from the east end of the layout there is a pulp storage building, 78 x 162 feet, which has a platform and a railroad siding alongside the double track road. Next to it is a building, 78 x 231 feet, used as offices and as a supplies and repair shop. This building also contains a bleacher room, 200 x 78 feet, with nine large concrete bleacher tubs. South of the bleacher room is the machine room, 49 x 269 feet, while east of the latter is the screen room, 150 x 156 feet, divided into two parts, with coarse screens in the southerly section, and fine screens to the north. Next are the four blow pits, 67½ x 81 feet; each pit measures 18 ft. 6 in. by 52 ft., with a depth of 16 ft. 8 in. at one end and 15 ft. 2 in. at the other.

The digester house, to the north, is 35 x 81 ft. and contains four digesters, 16 ft. in diameter by 54 ft. 6 in. high. These are fed by a conveyor in the monitor on top of the buildings. The acid plant is 57 x 58½ ft. It is proposed to install an electrolytic plant at some future date. Between the site of this plant and the digester house is the filter building, 60 x 73 feet, with provision for expansion northward as may be necessary. The power building is east of the main group, and consists of a turbine room 72 x 78 ft., and a boiler room 72 x 164½ ft. Power is furnished by four batteries of boilers of 950 h.p. each, manufactured by the Edgemoor Iron Company, which operate steam turbines, there being provision made for installing a fifth battery. All the water required—about ten million gallons per day—will be pumped from the North River and conveyed 1½ miles by means of pipes. It is proposed to generate all the electricity required for running the plant and for lighting purposes, the Canadian Crocker Wheeler Company, of St. Catharines, Ont., supplying the electrical equipment.

The waste wood, sawdust, is collected and conveyed by a system of belt elevators to the boiler house, where it is used to supplement the coal. The refuse consists not only of the wood room waste, but also of the sawmill waste.

A New Town Created.

The erection of the plant has resulted in the establishment of a new town, which has been laid out by Mr. C. Allbright, of Philadelphia. The company have built about fifty houses, another 125 have been constructed by private owners, while there are 25 stores and a moving picture theatre. The company are the owners of a general store.

The saw mill, shingle mill, yards, and railway were designed by Mr. H. W. Racey, who has just resigned as general manager, but still remains in a consultative capacity with Messrs. Chandler Bros. and Company, the bankers and promoters; Mr. H. S. Ferguson, of New York, designed the pulp mill, Mr. E. W. Prouty being the resident engineer. Mr. J. [illegible] was the superintendent for the construction company while Mr. J. E. Hamel, of the Waterous Engine Works Company, was construction superintendent of the saw mill. Mr. Gustave Hansen is pulp mill superintendent; Mr. [illegible] mill superintendent, and Mr. [illegible] bush superintendent.

The plant is equipped throughout with the "Manufacturers'" Automatic Sprinkler System, supplied and installed by the General Fire Equipment Company, Ltd., of Toronto. This equipment consists of [illegible] automatic sprinklers arranged and spaced according to the latest insurance rules; two 1,000 gallon underwriters' fire pumps which force the water through an extensive hydrant system, and branches from that through various buildings, each building being separately controlled. Supplementing this is an auxiliary supply 40,000 gallon tank on a trestle, the bottom of which is [illegible] ft. higher than the highest building.

PAPER MILL COST ACCOUNTING

By CLINTON H. SCOVEL, A.M., C.P.A.
Boston, Mass.

When cost accounting is mentioned, most business men immediately think of a clerical department which is engaged in working out the cost of the different articles produced, so that the management can determine a selling price for each. Although accurate costs are of great value for this purpose, we have found in practice that other aspects of the work, while less known, are of considerably more value to the average business. In what I have to say to you gentlemen today, I shall try to bring out some of these other functions of a cost department and show how an organization of this kind can be used to make your business more prosperous and successful.

Successful management must necessarily be well-informed management. The primary object of cost accounting is to secure dependable information for owners and managers, and to present it in a clear, concise way.

The basis of good cost accounting is analysis. You are all familiar with the three main divisions of cost—namely, material, labor, and overhead or burden. Every manufacturer has these three factors to deal with, no matter what his product, or how simple or complex his cost system. In paper mill cost accounting the analytical method is used in two distinct ways: First, when we recognize that papermaking is made up of many distinct operations; and second, when we separate burden into its elements and consider each element in applying the burden to the product manufactured.

The Cost of Halfstuff.

As examples of the many operations, rags are taken from storage, thrashed, sorted, inspected, cut, and dusted. They are then cooked for several hours, after which they are washed and bleached and finally run into a drainer.

This entire chain of operations is directed solely to making one of the components of your paper commonly known as ''halfstuff.'' In tracing the manufacturing operations so far, we have passed by another subsidiary process, the manufacture of bleach.

If we are considering papermaking from wood pulp, there is the long chain of mechanical and chemical operations resulting in the sulphite or soda pulp, which is as distinct a product as if it were manufactured in another plant.

The Cost of Rough Paper.

When you have prescribed a furnish for your paper, you may use not only halfstuff and one or more kinds of wood pulp, but rosin size and color, and then as your product moves from the beaters to the stuff chest through the refining engine and on to the paper machines, there is completed another fairly distinct stage in the manufacture of your product. Here ''broke'' begins to appear for the first time, and it is a very important factor to be reckoned with in the cost of your product, whether it is returned to the beaters in the same or a later run.

Finishing Costs.

The rough paper from the machine may be finished in many very different ways, being dried on the machine or by any one of the several ''loft'' methods, then plated, calendered, cut, sorted, counted, trimmed, and sealed. After the paper has gone through one or more of these various operations, there is packing and shipping still to be considered.

Each of these operations, from the furnishing of the beaters to the shipping of the finished product, is a manufacturing unit, having a special duty to perform and a special method of performing it.

Just as any factory takes in its so called raw materials, which are, with few exceptions, merely the finished product of some other plant, so these paper manufacturing units take in as raw material the finished product of a brother unit, and, after performing certain operations upon it and perhaps adding certain other products to it, pass it on as their finished product, to become a raw material for the succeeding unit.

These units, or departments, are distinct from each other, occupy different space, use different machinery and labor, material and supplies, and are under different supervision. They will therefore have widely different degrees of efficiency and widely different charges against the product, which must be kept separate in all correct paper mill accounting.

Power Plant and Repair Department.

The analysis of the operations should not be limited to the departments that turn out a tangible product, but should be applied to the power plant which provides steam and power to the other units, and to the repair department which supplies services and repair parts. Every department using steam or power should be charged with its correct proportion of the cost of operating the power plant; and every department having repair work done should be charged, not merely with the wages of the repair men, but also with a fair proportion of the expense of operating the repair department, just as an outside company would add something to the wages of their men to cover the cost of their shop. The cost of every repair job should be recorded and charged to the department in which the work is done, so that the man who is responsible for the efficient operation of the department will constantly watch the repair charges.

The consideration of the power plant and the repair department as individual units is a necessary preliminary to the calculation and distribution of overhead charges or burden, so that they can be logically and accurately applied to the product as it goes through the successive manufacturing operations.

What is Burden?

Suppose you were to occupy a mill completely equipped with machinery and furnished with heat, light and power at a rental of $10,000 a month. This rental you would certainly charge against the cost of operating your business, and you would not consider that you had made a profit until this amount had been taken into account. Now let us see what items of ex-

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Address before the Writing Paper Manufacturers' Association at the annual meeting in Erie, Pa.

pense an analysis of this rental discloses. First, the landlord has been compelled to pay taxes on the land, buildings, and equipment; he must carry insurance as protection against fire, incur the cost of producing power, heat and light, keep the plant in repair, provide for its inevitable decay or obsolescence, and, lastly, the landlord must get interest on his investment, and pay for the cost of looking after the property, before he has realized a profit. If you, as a papermaker, should operate under these conditions you would be relieved of the responsibility of the landlord by the payment of rent and be engaged only in producing paper.

Now, suppose that you are the landlord as well as the manufacturer. You then become a landowner, a taxpayer, and must take over all the expenses of the landlord just the same as if you paid them indirectly through the rental. Probably you also become a manufacturer of heat, power, and light; therefore, unless you analyze the various functions which you perform, and then determine the expense of performing these functions, before applying it to the cost of your goods, how can you tell whether you are not making money as a landlord and losing it as a papermaker? How do you know that you cannot purchase power, heat, and light cheaper than you can produce it?

Cost accounting in a paper mill really becomes very much simpler after an analysis has been made such as I have described, and the departmental operations not only clearly recognized, but the burden which belongs to each properly distributed.

I am very much inclined to say that the most important single consideration in respect to cost accounting, as it deals with burden, is to make sure that **all** expenses of this character are not only recognized and distributed, but that they are actually charged in full to the respective products which the mill makes by some just methods such as the machine-hour rate.

Efficiency in any factory, mill, or shop is wholly a question of getting a suitable return for the expenditure made, and this question will never be properly answered unless there is charged to each and every department, not only the payroll, but also the proper proportion of fixed charges such as I have described.

Unearned Burden.

Many manufacturers are accustomed to say that when the volume of production diminshes, the average or unit cost increases. On the contrary, if your production falls off, because of poor business conditions, the burden should be absorbed only in proportion to what you have actually produced.

A three-machine mill, for example, finds it necessary, owing to lack of orders, to shut down one machine for a week. Throughout the month this machine has been running at a high degree of efficiency, producing a grade of paper which cost, let us say, [illegible] a pound, but had previously cost [illegible] a pound. If you load on to this [illegible] cost the fixed charges of the week when the machine was idle, you raise the cost to perhaps [illegible] a pound. The cost of the paper made during the three weeks when the third machine was running was not actually any greater because the machine was down for a week, any more than the cost of the paper made on the other two machines was greater because of the shutdown. The unabsorbed burden for the week represents unused capacity and is a direct loss that cannot justly be loaded on to the production costs of other machines, or other weeks.

This method of including in the cost of the product only the amount of burden that it has actually used is not only correct in theory, but it has several very practical advantages. First, the costs are made up on the same basis at all times, and a comparison of similar runs gives a fair measure of the efficiency in the several departments. When an attempt is made to absorb all the burden each month or period, the comparative costs may lose all significance because of the variation in production. Second, the inventories taken at cost prices will be on the same basis each year, while with the other method the inventory at the end of a poor year would be loaded with a higher percentage of burden, which would partly obscure the poor results and then make the next year absorb part of the loss in the apparently decreased margin of profit between the loaded costs and the selling prices.

Effect on Sales Policies.

When burden charges are reckoned as they should be in the cost of the product, the management is sure to have a very different attitude towards certain sales policies, especially in times of slack production.

The difference between the total burden and that absorbed by the paper actually made during the month or period measures the loss from unused capacity in dollars and cents. We have introduced this method not only into paper mills but into many other industries. In numerous instances where the directors have voted to curtail production, the results of the first month's operations have shown them how much has been lost from unearned burden, and they have immediately decided to keep the mill running full even if they could not sell the product at the usual margin of profit—perhaps at only enough above the cost for material and direct labor to carry part of the burden. With this definite knowledge of true costs for burden as well as material and labor (which vary almost directly with the volume of product) the management can decide how far it is advisable to reduce prices in order to keep up full production, and they can do this by actual comparison of reliable figures and not mere guesswork. In times of business depression a method of distributing all the burden over the paper actually made is really worse than mere guesswork, because the management, having figures which they believe are reliable, may lose business which is really profitable (because the burden cost is so high that it appears unprofitable).

I am sure that some of you gentlemen are wondering what happens to the loss in dollars and cents from unused capacity, and how a mill can be run without taking into consideration the enforced shutdowns due to business depressions, low water, or other special causes. My answer is to admit that these losses must be taken into consideration in fixing selling prices, although they should not increase manufacturing costs. In order to earn a fair net profit, the selling prices, over a period of years, must be enough above the manufacturing costs to cover selling expenses and cover the average losses from shutdowns and unused capacity.

Cost Accounting and Efficiency.

Whatever the effect on sales policy, comprehensive cost accounting, appropriate to a paper mill, is a positive help to efficient and economical manufacturing. Where raw material is one of the [illegible] elements of cost, factory accounting at the very beginning provides for the control of inventories, insuring that the investment in stock of various kinds is kept at the economical minimum. The stock clerk, at the same time, is responsible for keeping the quantities of various items at the proper balance to supply manufacturing needs efficiently. When the cost records are "tied in" with the general accounting, the management has complete control not only over the operating expenses of the factory, but over the inventories of raw material, work-in-process, and finished product.

A cost-accounting practice, including burden charges carefully analyzed and applied, not only provides for an accurate determination of the cost of the product but it also enables the management to compare different ways of making the same or a similar product. They can determine on which machine their various orders will run to the best advantage, with a minimum of broke and shrinkage, and a maximum of production. They can find the point on each order where greater speed is no longer an advantage, where the loss due to breaks would offset the gain due to increased production. They can determine the best furnish for each grade by noting the effect, on the cost sheet, of each change of furnish, as compared with previous runs of the same grade. Incidentally, they may discover that an apparent saving in the cost of the furnish is often nullified by its effect on the speed with which the paper can be run, or on the broke and the shrinkage.

Accurate Furnish Costs.

How can you tell the exact effect on the cost of a given paper from putting more or less woodpulp or rag pulp into the furnish unless you know as accurately what the ragpulp has cost, as you do the cost of the woodpulp which you purchase outside, ready to put into the beaters? Dependable costs are particularly important in a mill where halfstuffs are made and used. The raw stock passes through a number of processes, each carrying more or less heavy burden charges. Varying losses occur during certain of these conversion processes, and unless all labor and burden charges are applied, and an accurate knowledge of yields obtained, the halfstuff will frequently go into the beater, as one of the constituents of paper, bearing a fictitious value. The general tendency is to undervalue this stock at the beaters, where it is combined with pulps whose value is definitely known. Therefore, the greater the quantity of halfstuff used, the more urgent the need for sound costs.

The cost records will show at once whether a more expensive material has been charged into the furnish than was ordered, whether greater quantities of some of the materials have been used than was ordered to make a given grade and weight of paper, and whether the estimated yields from different raw stocks agree with the actual yields.

Departmental Costs.

Having described the analysis which is essential to get the successive subdivisions of manufacturing operations in a paper mill, I wish now to call your attention to the fact that each and all of these operations have an individual cost that goes up or down according to the various circumstances affecting production, but depending chiefly upon the skill and energy of the superintendent and his foremen. Papermaking is an industry of skill, requiring in some respects highly technical chemical tests, which, in turn, depend for successful operation on accurate records of time ,temperatures, pressures, etc. You will all agree that the control of mill chemistry depends upon having these records in trustworthy form. Accurate cost accounting not only requires adequate records, but when these records are kept and the costs are known, an intelligent manager will immediately use them to increase the efficiency of the departments.

These records, when accumulated over a period of some time, will set standards for production which can be used as bases for comparison of future operations. When a new order is to be run, the best previous order of a similar kind and grade of paper should be set up as a standard to see if the men on the machines cannot beat the former production and decrease the cost. If handled in the right way these costs and production records become very valuable aids to the foreman in running their departments most economicaly and efficiently.

Production Reports.

The cost and production reports also bring close together the control of materials and the control of operations.

The management will know, for example, exactly how long the various kind of rags were in the bleach boilers, how long in the washers, how much substance was lost between the weight of dry rags and the fiber finally deposited in the drainer, how much of this halfstuff, and pulp to go with it, was put into the beaters, how much sizing and coloring matter was used, and finally, how much of the furnish emerged as salable product. I understand, of course, that some paper manufacturers, who have done but very little in the way of cost accounting, have excellent records of this kind, and when this is true, I can only think what a pity it is that these records are not used, with the very little modification which they probably require to bring out reliable costs of the several operations.

The same production reports, properly arranged, serve as a basis for the efficient supervision of labor. Cost accounting in respect to labor charges consists primarily of reporting correctly the orders and runs on which the work has been done, or the expense or other special accounts to which the payroll should be charged. It is essential that the accounting should carefully separate manufacturing labor costs and labor costs due to the numerous kinds of accessory work carried on at the plant. Only when such additional elements of expense are carefully separated from the current cost of manufacture can the productive departments be held strictly responsible for the results obtained from a given payroll expenditure.

In most cases it is tremendously important that the results should be reported promptly to the factory superintendent, to the foremen, and, in many instances, to the workmen themselves if the efficiency of the factory is to be kept up to a satisfactory standard. Some surprising results have been obtained from the use of labor records which gave the management prompt and reliable information as to what each workman in the mill was doing. Production is frequently increased simply from the moral effect of having the records.

Danger of Tests and Averages.

Now that I have outlined the characteristics of a sound cost-accounting practice for a paper mill, I would like to call your attention to the inaccuracy and the danger of wrong information which lurks in much of the so-called "cost finding" still in vogue in a great many paper mills. Some manufacturers, for example, estimate the cost of different grades of paper with a great deal of care, and feel very uncomfortable in regard to the accuracy of these estimates, because when multiplied by the quantity of each kind of paper made, they account very nearly for the total cost of mill operations during the year. You may be interested to know that we have found paper mills where this kind of cost calculation has received a good deal of attention, and yet a really analytical cost practice showed that the calculations contained serious errors in regard to some of the important products in the mill.

Combining facts that really differ gives a meaningless average. When a paper machine can produce thousands of pounds more paper in a day on one grade and weight than it can on another, there is little to be gained by attempting to average facts which are significant to a management only when their exact variation is recognized as accurately as possible. Finishing costs vary tremendously, as we have demonstrated conclusively to several paper manufacturers, and when the cost of packing and shipping is carefully separated from other charges in the factory, there are sometimes surprises in store for practical men as to the variation in cost arising from the different ways of selling their product.

How to Use Averages.

And yet average costs, which I have spoken of as a danger to be avoided, are of the utmost importance under certain circumstances. It may seem at first sight that a carefully kept record of the results of a test run can be relied upon to guide the management in making a particular kind of paper, or in fixing the price at which to sell it. The fact is, however, that a test run may be seriously in error. Workmen under such circumstances are apt to perform very much better than they will under average conditions. It is quite possible, on the other hand, that they will encounter some obstacles which can be removed by a further experience with the product in question, so that the test run offers not only the danger of a performance at a higher standard than can be maintained, but also the unsuspected danger that the costs are higher than need be, because of the comparative unfamiliarity with the operation in question. We have found it particularly important in paper mill cost accounting to get averages on successive operations which are of a kind that will permit of averages, not only for labor costs, but also for materials, in view of the great difficulty of determining the accurate dry weight, not only of halfstuff, but also of the wood pulp used in the furnish.

Summary of Cost Methods.

To summarize briefly the points which I have called to your attention, the basis of good cost accounting is analysis. It is essential to recognize as many different operations as can be clearly defined, and to determine the cost of each and the contributions they respectively make to the various kinds of product.

The accurate determination of burden in which you recognize each element and distribute its total charges to the respective departments making use of the facilities which cause the burden charges, is of the utmost importance in a sound cost-accounting practice.

I must urge upon you again the importance of having the cost accounts include all the expenses of the business, of charging interest on the investment and of making an adequate provision for depreciation for reasons which I have already given at some length.

It is not only important to include all of these charges in working up the burden in a paper mill, but we have found it of particular importance to consider the total of these charges in comparison with the normal product of the mill. Burden for the most part represents capacity. If the output is normal the burden rate is in fair proportion to the product. If the output falls off strikingly, it is the greatest possible error in cost accounting to say that unit costs have increased accordingly. The fact, under such circumstances, is that a large part of the mill's capacity is actually unutilized, and that the owners have to carry, without profit to themselves, the fixed charges on the idle equipment. It is only in this way that costs may be secured which are strictly comparable one season with another, and so reflect accurately the efficiency of the respective departments, unobscured by fluctuations in volume.

The final test of the accuracy of cost accounting in a paper mill or elsewhere is that it shall prove with the financial books.

Need of Competent Supervision.

To those who are interested in improving the cost-accounting practice in their mill, I would urge the importance of securing a competent man to take charge of the cost system when it is installed. A man of the right sort can earn his salary many times over in getting out facts for the management and presenting them in such form that they may be readily used to increase the efficiency of the mill. It is also essential to the successful operation of a cost system that it should have the vigorous support of the management. The success which has attended our efforts to establish costs in paper mills has been due in a large measure to the the interest and the authoritative support which we have secured from the owners and active managers of the mills.

Finally, to you gentlemen gathered here as an association of manufacturers, interested in a similar product, and therefore operating under similar conditions, I would urge the importance of reaching some common understanding as to what constitutes the cost of paper. Conditions in your several mills vary so much that the exact details of procedure which work with a high degree of efficiency in one mill will not be exactly suited to the conditions elsewhere. It is of the greatest importance to all of you, however, that you agree on the elements or fundamentals of a good cost practice; chiefly to make sure that all of the elements involved are included in your calculations, not forgetting interest on the investment and an adequate provision for depreciation, as well as all the charges which you ultimately disburse through your cash book during the course of a year's operation.

WORKMEN'S COMPENSATION IN MAINE.

Bangor, Me., January 31.—One of the bitterest fights to take place in the present session of the Maine legislature this winter will be over the proposed Workmen's Compensation Act, which is to be introduced shortly. This proposed law affects the pulp and paper interests of the State particularly, as that industry employs a large percentage of the men engaged in industrial work in Maine.

Strong opposition has developed which will make itself evident in the legislature. The State Federation of Labor is solidly behind the measure, which is patterned after the Massachusetts law. The bill was before the legislature two years ago, when it occasioned a long debate, and was finally defeated in the closing days of the session.

WHO'S WHO IN THE CANADIAN PULP AND PAPER INDUSTRY

JOHN G. SUTHERLAND, Sales Manager Spanish River Pulp and Paper Mills.

"It's a long way to Tipperary" but that is not the only long route, for the sales manager of a big news print organization often journeys thousands of miles to renew a contract or secure a new customer for his firm. Talk of travel and vast distances, what does the reader think of riding seventy thousand miles in one year by trolley, rail and boat! To make use of a colloquial term, that is "going some," yet it has been covered by John G. Sutherland, of Toronto, one of the sales managers of the Spanish River Pulp and Paper Mills, in jaunts all the way from Mexico to the four corners of the American continent. He has been a telegraph operator, a stenographer, a bookkeeper, a shipping clerk, a traffic manager, a salesman of chemical and sulphite pulp, lumber, charcoal and news print as well as a paper dealer, an assistant to managers of companies and a general sales manager.

His career has certainly been an interesting and strenuous one and being a graduate of the hard school of experience, there is not a great deal about pulp and paper, market conditions, shipping, transportation, routing, freight rates, etc., that he does not know. Mr. Sutherland has always kept in close touch with things around pulp and paper plants, and his acquaintance with these products is of no superficial character. He is possessed of the knack of getting at the bottom of affairs, and there are few men who can discuss problems connected with the trade more intelligently or instructively.

His boyhood days were spent in Listowel, Ont. After he left school, his first job was with the G.N.W. Telegraph Co., where he ran messages and learned the key. Then he took a situation with a piano manufacturing company in his native town, and received a good training in office routine. His introduction to the pulp and paper line came about a year later, when he engaged with Sault Ste. Marie Pulp & Paper Co., being assigned various duties, first in the mills, working on the grinders and wet machines and testing pulp, and next in the office as stenographer, telegrapher and shipper. The company had an output of one hundred and twenty-five tons daily of ground wood pulp, and an equipment of thirty grinders. Some fourteen years ago the subject of this reference was made sales agent of the organization. He was handy, useful and dependable in many capacities and could turn off work with thoroughness and dispatch. Gradually the company at the Soo branched out in other lines of manufacture, putting in a cylinder machine for making wrapping and building papers, a tar paper plant, a veneer mill, a sixty-ton sulphite equipment and a charcoal plant with twenty-two retorts, which was operated by the Algoma Commercial Co. The outputs of these industries were sold by Mr. Sutherland, who also supervised traffic arrangements, except that of the Algoma Central and Hudson Bay Railway.

Was he busy? Well, he never went to bed on the same day on which he arose. It was part of his work, and he did not shrink from the heavy load. His business relations brought him in contact with many men, prominent and influential in the trade, and six years ago he was made sales and traffic manager for the Minnesota and Ontario Power Co., with headquarters in Minneapolis. Later he was transferred to International Falls as assistant to the President of the Company, Mr. E. W. Backus. In that responsible post he remained for nearly three years, and in December, 1911, came to Toronto, becoming Vice-President, and purchasing an interest in the Ratcliff Paper Co., Limited, one of the largest and most widely known jobbing houses in the province. In October of the following year, he joined forces with the Spanish River Pulp and Paper Mills, as general sales and traffic manager. A few months after was made assistant to the managing director, having meanwhile sold his holdings to Mr. Ratcliff. On the amalgamation of the Spanish River Co. and the Lake Superior Paper Co., and the subsequent transfer of the head office to Sault Ste. Marie, Ont., Mr. Sutherland remained in Toronto for some time, but during the past few months, his location has been in Dayton, Ohio, for the reason that a very large proportion of the 425 tons daily output of news print of the company at their plants in Espanola, Sturgeon Falls and Sault Ste. Marie, is marketed across the border. In association with Mr. J. T. Mix, he looks after the sales of this enormous production and travels over the Continent—from New York to Denver and from Halifax to Winnipeg. The major portion of his time is spent on the road.

Mr. Sutherland, who is only thirty-eight years of age, has always taken a deep interest in outdoor sports, and in his 'teens played hockey and lacrosse, being one of the organizers of the International League, while at the Soo. Fond of bowling, he belongs to the Granite

Club, Toronto, but his chief delight, outside of closing remunerative contracts for news print with leading Canadian and American publishers, is in a game of golf. He is an enthusiastic member of several clubs in Toronto, and points in the United States. His busy, active life, however, permits of comparatively little leisure. Genial and courteous under all circumstances, no one ever saw Mr. Sutherland in a downhearted mood. He has many friends in the trade, for, in the words of a former employer, he "wears well, talks interestingly and works whole-heartedly."

Peat in the Manufacture of Paper

By M. A.

(Translated from "La Papeterie Francaise, for Pulp and Paper Magazine, by C. E. Bandelin.)

The use of peat for paper manufacturing purposes was suggested long ago, and paper industry periodicals have many times published patents relating to this subject.

Canada is one of the papermaking countries most interested in the use of this raw material, as the area of peat bogs there exceed 30,000,000 of acres, or 10,000,000 more than in the U.S., and more than any European country, except perhaps Russia. Many different methods have been suggested for utilizing the peat; as fuel, as gas producer, as raw material for the manufacturing of alcohol, as litter, as packing material for fruit, etc.

Previous experiments in using it for papermaking purposes however don't seem to have given very encouraging results from an economical standpoint, either with peat alone or mixed with woodpulp. The lack of success met with may be explained by several reasons. Several authors describe quite seriously digesting methods with soda or other chemicals under high pressure, sometimes followed by a bleaching with chloride of lime. The only result of such methods is the rapid vanishing of the capital engaged without any hope of future profits.

It must be remembered that the general term "peat" includes a great variety of vegetable substances, which have been submitted to a more or less advanced decomposition in the ground. It is evident, that a peat can give promising results or be immediately rejected, depending upon, if it is of recent or old formation, or upon which organic substances it contains. In this manner the peat from the very vast bogs near Amiens (France), has been found impossible to utilize in any industry. Its state of decomposition is too advanced, and it crumbles to pieces when dry. Such peat may be used as a fuel and give gas by distillation, perhaps it may have other uses, but not for paper making.

Another kind of peat, however, occurring for instance in the department of Basses Pyrenees has been experimented with and can certainly take a place among the raw materials for papermaking.

In most peat bogs there exists at a certain depth below the surface, 2-7 ft. sometimes a layer of only slightly decomposed peat, in which the constituent elements of the plants are found only a little changed. Below this layer the peat is decomposed, darker, and cannot be used for papermaking purposes.

In the experiments in question only the manufacture of cardboards was tried as the peat seemed to be less suitable for paper manufacture, perhaps with exception for certain very dark-colored tar-papers.

The peat was used as it was taken from the bogs, without previous washing. It may be remarked, that it contained very little earth and extraneous matter. The washing of peat gives a very dirty, dark-colored wash-water, which cannot be let out into rivers or lakes, as this would cause complaints and difficulties.

The author simply refined the raw peat a little in order to cut off too long fibres, and to beat up certain roots, somewhat coarse; he added digested straw pulp, about 50 per cent, and obtained a cardboard of an agreeable brown color, both strong and pliable. Its strength was certainly superior to cardboard made only of straw. He also obtained a satisfactory product by mixing 50 per cent of peat with 50 per cent of old paper.

The experiments were executed on a very small scale and no advices as to results obtainable on a manufacturing scale can be given. It, however, seems as if the kind of peat used when only a little decomposed could very well be used for cardboards without any digesting. The screening surface of coarse must be large and continuously cleaned. The riffler also must be of ample dimensions.

It may be advisable to use the water passing through the wire over again, in order to have as little as possible to discharge in the river. The wire ought to be long and the speed slow on account of the high proportion of very short fibres, and also because some of the fibres possess a remarkable degree of "greasiness." The natural color of the peat does not permit manufacturing of light-colored boards, at least only if a very small percentage is used.

From an economical point of view the use of peat under the stated conditions seems intersting on account of its cheapness. It is impossible to give a price for peat here, as it mainly depends upon local conditions. The mechanical extraction seems possible, but the problem is far from being solved for peat only a little decomposed and still rich in fibres, which cannot very well be taken from the bogs by means of excavating machinery.

Extraction by hand is laborious and expensive. On the other side, if the peat is utilized on the spot, it is not necessary to dry it, but for transport an air-drying is indispensable, as the percentage of water often reaches 85 per cent.

The peat is a raw material, notwithstanding all this, which the cardboard manufacturer in certain regions can obtain cheaply and which can be useful to him; mixed with straw pulp or old paper it will give, if sufficiently fibrous, cheap cardboards of good quality.

QUEBEC CULLERS' ANNUAL REPORT.

The following comparative statement of timber measured and culled to date at Quebec is furnished by the Supervisor of Cullers' Office, Quebec, P.Q.

	1912. cu. ft.	1913. cu. ft.	1914. cu. ft.
Waney white pine ..	1,172,120	[illegible]	[illegible]
White pine	1,760	7,560	——
Red pine	[illegible]	[illegible]	1,040
Oak	118,840	177,240	[illegible]
Elm	[illegible]	[illegible]	305,760
Ash	[illegible]	[illegible]	680
Birch and Maple	[illegible]	[illegible]	50,800

CHINA CLAY

By ALEX. ANNANDALE

This material is the most largely consumed of any loading used by paper makers as it is the least expensive and most suitable material obtainable for the purpose for which is is required.

A great deal might be written about the different reasons, which led to its use, but we may leave this out, and proceed to the object of this article, which is written for the purpose of giving some hints as to the best way of handling it in a paper mill.

China clay, in this country is obtainable from two principle sources—viz. Cornwall, Eng., and the States,

There are many different grades of clay come from Cornwall, and papermakers should never purchase except on sample, and on delivery see that the clay is equal to sample.

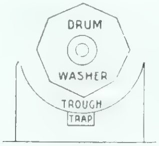


FIG. I

With regard to the clay from the States, commonly called "Domestic," generally speaking it is not nearly so good as any reliable English brand, being behind in cleanliness, in color and in fineness of particles.

There is another source of clay supply in Canada, but there seems to be considerable delay in developing it, which is a pity, as from sample cars which the writer has seen and worked, it appears to be the best clay of all, for color, cleanliness and fine division.

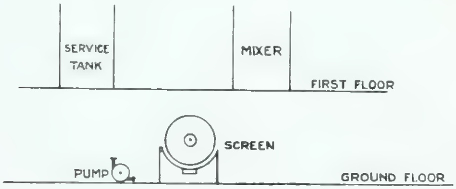


FIG. 2.

Whichever brand of clay the papermaker buys, if he wants a respectably clean sheet of paper, he has to set about cleaning his clay carefully, just the same as he would do with whatever fibre he uses.

To begin with clay ought not to be shipped to the mill in bulk, from its place of origin, because if so, in transit it is sure to collect a quantity of avoidable dirt, which is merely an addition to the natural dirt it contains, and means so much more to be got rid of. It will cost more, but it is certainly better to buy clay delivered in either casks of bags.

When a car of clay arrives at the mill, no matter how shipped, see that it does not get more foreign dirt in course of transit to store. There are few mills where it does not.

The storage should be in a clean, dry, and well lighted place. If the clay has to be hoisted at all, hoist it at once to the floor where the mixers are, and store it there, on no account store it in a dark, damp and dirty celler because it is "only clay."

When you start mixing clay be sure that your water supply is properly strained and that your mixing pot is clean.

As to position of mixers it is best to have them up as high as possible, so as to avoid any pumping, because clay is very destructive to any pump. It is therefore best to mix your clay on an upper floor, so that after mixing the clay can flow by gravity to the point where it is screened, and from there to service, or store tank, from which it can be drawn to measuring tanks at beaters.

As to mixing, do not grudge having plenty mixing power, never have less than two mixers, so that while one is mixing, the other can be screening. Do not grudge time in mixing, for the longer you mix the better percentage of retention will you obtain. This assertion can very easily be proved by anyone doubtful about it.

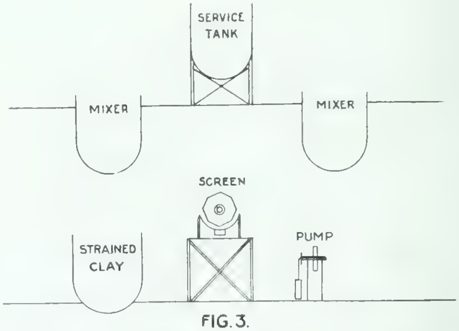


FIG. 3.

After mixing comes the straining. This is very commonly done through an ordinary flat sieve, covered with wire cloth (generally old machine wire). This is certainly not effectual as the wire is always inclined to choke up, and requires constant attention and rubbing, and tapping pretty well all the time. This gets the clay through, and also a goodly proportion of the finer dirt. A few minutes neglect and the strainer runs over, and the whole collection gets into the beater.

The simplest and most effective screen is really an ordinary drum washer, fixed up as in Fig. 1. The clay is run from the mixer into the vat and passes through the wire cover of the drum, leaving the dirt behind, so that it collects in the trap at bottom of vat.

When all your mixer is strained, open the ends of trap, and hose out the dirt. Turn on the spray above drum for a minute or two, and all is clean for the next lot. On such a drum a 100 mesh wire can be worked with ease and if looked after and kept clean, it will last for many months.

From this drum washer the well strained clay is delivered into the service tank and thence to beater measuring tanks.

By no means remove the old flat screens at beaters, keep them as an additional precaution to prevent any possible scale from tanks or pipes getting into beater. Wash out mixers, service tanks and measuring tanks at frequent and regular intervals and you may be sure that you will have clean clay.

In many mills it is impossible to obtain the ideal gravity arrangement throughout. In such cases it is advisable to mix, run down, pass through drum and pump up to service tank. The pump will not be nearly so troublesome, when pumping well screened clay.

Fig. 2 shows an arrangement of this kind for a small consumption, and Fig. 3 for a large consumption. The design as shown in Fig. 3 was put up to handle four tons of clay at a time.

The mixers were emptied alternately through the drum strainer, and into the bottom tank, from which it was pumped to the top tank, which was sufficiently high to give gravity flow to measuring tanks.

The top and bottom tanks held sufficient strained clay, to supply the mill during the night, so all clay straining by night was avoided.

Every tank had an agitator, and no clay reached the beaters without about 12 hours agitation. This so increased the retention, that a very large saving was made in amount of clay consumed.

Ottawa Notes

Ottawa, Ont., February 10.—The measures taken some time ago in the direction of conservation by the James MacLaren Company, Ltd., of Buckingham, in engaging a New York firm of forest engineers to estimate its timber resources and advise as to their reproduction, have resulted in a lawsuit. Action has been instituted against the lumber company by Messrs. Vitale and Rothery, New York, the amount claimed being 18,338.50, still due for the cruising of 1,411,634 acres of timber berths. The company asserts that faithful reports were not given, and refuses to pay while the forest engineers state the company is dissatisfied because inflated values were not given.

The MacLaren Company gave the New York firm a contract in the summer of 1913 to report on the extensive timber and pulpwood berths they own. The forest engineers carried out the contract without, as they allege, any criticism by the defendants of the manner of its performance. They were notified last October, however, that the contract had been cancelled because they had not furnished reliable reports of the general conditions of quantity or quality of the timber as called for in the agreement. They were offered a smaller amount than had been agreed on in payment, but refused to accept it and have sued for $18,338.50, the balance still owing on their total claim of [illegible]. They state that the only reason for the defendants' dissatisfaction has been the accuracy and conscientiousness of the examination made of their property, whereas they appeared to desire the rendering of inflated values.

There were [illegible] feet of lumber less cut in the Ottawa Valley in 1914 than in 1913 according to official figures of the lumber cut just issued or [illegible] less than in 1912. The decrease was generally shared by paper manufacturing as well as lumber companies. The J. R. Booth Company in 1914 cut 35,000,000 feet as compared with [illegible] the previous year; the James MacLaren Company of Buckingham [illegible] as compared with 20,500,000 in 1913 and the Riordon Pulp and Paper Company [illegible] feet as compared with [illegible] feet in 1913.

It is understood that among the rates to be advanced by the railways will be those on pulpwood and paper products.—MAC.

An estimate of the cut of logs in the woods this winter places it at about 40 per cent less than in 1914. This does not include pulpwood, however, of which the production is expected to be much larger in order to meet the demand.

A statement of Canadian trade for the twelve months ending with December 1, just issued by the Trade and Commerce Department, shows that Canadian exports of paper products increased during the year while imports decreased. Exports were $14,828,565, as compared with $10,563,056 in 1913. Imports were $6,637,188 or less than the 1913 figures of $8,569,972.

The fifth session of Parliament commenced its sittings last week. From all indications it will not be one of much interest to the pulp and paper trade from point of view of the legislation likely to be brought down. The new war taxes to be imposed are not expected to include any pulp and paper products in their scope though the suggestion was made last session to put an export tax on pulpwood. This the minister of finance promised to take into consideration, but no announcement, of course, is forthcoming as to the result of his deliberations.

One piece of legislation of some interest to the pulp and paper trade is the re-introduction by Mr. George H. Bradbury of his bill for the prevention of the pollution of navigable waters. The discharge of the effluent from pulp and paper mills into navigable streams is one of the matters covered in Mr. Bradbury's bill, heavy penalties being provided.

The export trade will hear with interest that the Government is contemplating the establishment of a war risk scheme. This is expected to relieve the congestion which exists at present in the matter of shipping and which is seriously hindering the export of pulp and paper from this country to Europe.

The estimates for coming fiscal year were brought down in Parliament this week. They contain almost no appropriations for new public works of any kind which will mean a greatly reduced demand for building paper, tar-paper and other such materials.

Application for permission to increase the freight rates on all lines east of Port Arthur will be made to the Railway Commission on March 1 by the Canadian Pacific and Grand Trunk Railways under instructions issued by Chairman H. L. Drayton of the Commission on Tuesday. The date was fixed when the chairman heard from a C. P. R. official appearing before the board in another case that the railways were preparing to make the application in question. Mr. Drayton stated that it was right in the interests of the public that the application should be put in at the earliest possible moment, so that before spring traffic opens up shippers might have some idea as to what rates were to be advanced. He then fixed March 1 as the date of the hearing of the application, and set February 18 as the date when all the facts connected with the proposed change desired by the railways should be supplied to the officials of the board, to the Canadian Manufacturers' Association and other organizations interested. He also stated that when the application came up for consideration, the recent advance of 5 per cent in the movement of international freight, put into effect by American lines operating in Canada under the jurisdiction of the Commission, would be dealt with, and will have to be justified or it will be disallowed.

CHINA CLAY RETAINED IN PAPER

SINDALL AND BACON.

The percentage of ash foundon igniting a given weight of paper is generally regarded as some measure of the amount of loading retained by the pulp in the beating engine.

In the case of certain loadings such as China Clay and Calcium Sulphate (Pearl Hardening), correction must be made for two factors which influence the result. These minerals as added to the pulp in the beating engine are by no means in the same condition as the ignited ash left in the crucible from the combustion of the paper. Thus China Clay is usually most, containing 8-10 per cent of natural moisture, which is easily got rid of by mere exposure of the clay to air, and in the second place it contains a fixed proportion of chemically combined water which is of course removed on prolonged ignition. The Sulphate of Lime also loses water of crystallization on heating in a crucible.

Thus a normal China Clay may contain 10 per cent of natural moisture and a further 10 per cent of water of combination when examined in the absolutely dry condition. The clay is almost invariably moist when purchased, a condition which favors its application to paper making. Hence if a known weight, say for example 3 cwt., of moist china clay is added to a known weight of paper pulp, say 20 cwt., the amount of clay actually retained by the paper can only be calculated accurately when due corrections have been made to the weight of ignited ash found by testing. If the percentage of ash found on igniting a weighed sample of the paper is 10 per cent, the retention of china clay appears to be 10 per cent of 20 cwt. which gives 2 cwt.

This is the amount apparently retained out of 3 cwt. originally added, and gives 66.6 per cent retention of original loading, but on the assumptoin that the clay contains 10 per cent of chemically combined water in its absolute dry condition, and a variable quantity, between 8 and 10 per cent of natural moisture, it is clear that every 80 parts of ignited residue would really be equivalent to about 100 parts of moist clay.

We may ignore for the moment that part of the ash of the paper due to traces of alum and mineral salts together with the natural ash of the pulp used, since these form only a small proportion of the total ash. Hence on this basis the correction to be applied to the 66.6 per cent would be obtained by multiplying 66.6 by 100, and dividing by 80, and then the actual percentage retained would be 83.2 per cent.

Even this correction can only be considered exact when the amount of natural moisture in the paper is 10 per cent. If the amount is less the correction given for the clay itself then becomes too high.

The ratio of clay to paper is most frequently determined from the quantity of paper made and the actual bought clay used. If the paper made over a period is 100 tons and the clay added to the beater is say 10 tons, then the records show the clay used per ton of paper is 1.0 tons, and this form of expression is obviously a practical one which fluctuates according to the variation in clay added. It is well known that common news will only carry a certain percentage of clay corresponding to a mineral ash of 7 to 8 per cent, and that this figure cannot be increased by an excess of clay in the beaters. These limits are easily found in practice and require no special comment.

We may consider this case more closely. If the paper made is 100 tons and the clay used is a normal clay containing 10 per cent of natural moisture, of which 12 tons have been consumed, what is the amount of clay actually retained when the ignited residue found by test is 8 per cent?

For the sake of simplifying the argument we can assume that the finished paper contains 10 per cent of natural moisture, which as a matter of fact seldom happens. The common news when leaving the paper mill seldom contains more than 5 to 6 per cent.

The paper contains absolute dry pulp and absolute dry clay 90 tons with natural moisture 10 tons.

The absolute dry pulp and clay contain 8 tons of ignited clay, water of combination of clay, and the pulp.

Every 8 tons of residue is equivalent to approximately 9 tons of absolute dry clay, on the assumption that the absolute dry clay contains 10 per cent of chemically combined water.

Now 9 tons of absolute dry clay is equivalent to 10 tons of moist clay as bought.

If we take it for granted that in a finished paper the pulp and clay alike contain the same percentage of natural moisture, a point open to consideration, then the conditions appear to be:—

Paper = abs. dry pulp + abs. dry clay + moisture
81 + 9 + 10
or air dry pulp + normal clay
(81 + 9) + (9 + 1)

Thus the original residue of 8 per cent becomes 10 per cent when corrected and the proportion retained is 10 tons out of 12 tons, that is 83 per cent instead of 8 tons or 67 per cent.

The cases in actual practice are by no means so simple as this example would appear to indicate. The percentage of moisture in the paper is an important controlling factor and must be taken into account. The paper mill chemist will no doubt be able to work out the problem more exactly. The chief point to be remembered is that the percentage of residue found on ignition needs correction before it can be compared under like conditions with the china clay originally added to the pulp in the beater.

RECOVERY OF WAX FROM GRAIN STRAW.

In a contribution to the Papierzeitung (97, 2,699), Dr. Emil Heuser, of Darmstadt, reviews the work that has been done on the recovery of wax from several kinds of straw.

The chopped straw (150 grammes) was heated in an autoclave fitted with a condenser with two liters of benzol at a pressure of 30 to 37 pounds per square inch for a total period of three hours and fifty minutes. The maximum amount of wax recovered was 1.20 per cent.

The remaining dewaxed straw, after cooking four hours at 45 to 60 pounds pressure with 1.44 per cent sodium hydroxide, gave the same yield of cellulose as the same quantity of the original straw, treated in exactly the same way. The cellulose from the dewaxed straw required .63 per cent less bleach and gave a better white.

Purification of Waste Liquors

An interesting article has appeared in the last issue of "The Surveyor and Municipal and County Engineer" on The Purification of Waste Liquors from Paper Mills, by G. Bertram Kershaw, late engineer to the Royal Commission on Sewage Disposal. This article, after dealing rather fully with the process of manufacture in all its various stages, and the nature of raw materials used, also describing some of the machinery and apparatus in general use and the several waste liquors produced, concludes as follows:—

It is very advisable that when kier liquors are mingled with the rest of the water it should be admitted gradually, preferably from a storage tank, and not in sudden rushes.

It is of interest to note that the Rivers Pollution Commission, in their first report, point out that "the greater part of the alkaline liquor of the paper maker might, with profit upon the operation, and certainly without much, if any, loss, be so treated as to recover the soda, even in the smallest mills, and under the most unfavorable conditions, and thereby relieve the river of this form of pollution.

It is not quite clear from the context whether the commission include dilute kier liquors in this statement.

The following figures of analysis, due to Mr. E. Halliwell, F. I. C., and taken from vol. iii. of the Seventh Report of the Sewage Disposal Commission, show the nature of the crude liquids before treatment derived from the manufacture of various kinds of paper:—

Nature of Sample	Parts per 100,000. Suspended Solids.	Dissolved Solids.	Oxygen absorbed in three minutes.
Waste Paper			
Crude liquors	204	[illegible]	20 (in 4 hours)
Do.	139	68	4.84
Brown Paper			
Crude liquors.	290	477	39.6 (in 4 hours)
Do.	59	106	3.98
Do.	126	178	25.1 (in 4 hours)
Wall Paper. .			
Crude liquors.	185	305	27.8 (in 4 hours)
Printing Paper			
Crude liquors.	6.2	264	3.92
Do.	89	157	2.30

It will be noted how extremely variable are the foregoing figures, and also that the main difficulty in treatment is likely to arise from the solids, both in suspension and in solution. Further, it must be remembered that paper mills discharge very large volumes of waste waters, 1,000,000 gallons and upwards per twenty-four hours being by no means uncommonly met with.

On the assumption that the strong kier liquors are treated for recovery, well-designed settling tanks, with facilities for precipitating chemicals, will effect a removal of a very large amount of the suspended solids together with a proportion of the solids in solution, and in most instances such a tank liquor, if not containing more than, say, 3 to 5 parts of suspended matter per 100,000, can be discharged to the river or stream without further treatment. A "[illegible]" mill, however, would probably have difficulty in getting down to these figures, while for a mill using solely wood pulp they would be lenient. Unfortunately, in some cases space for tanks is virtually unobtainable. Alumino-ferric gives good results when a precipitant is needed, but in special cases, careful straining through filters of fine material is called for in addition to tank treatment.

It is of distinct advantage if the various wastes can be stored before tank treatment in order to equalise their varying strengths, characters and temperatures.

Tilmans recommend separate treatment of the various wastes, but in the case of many existing mills it would be a very costly and difficult business to alter the whole of the waste liquor drains in order to keep any special liquor apart from the general mixed wastes, with a view to special individual treatment. At one mill with which the writer is acquainted the foundations rest upon solid rock, and the cost of redraining such a mill would be very heavy. In the case of a prospective mill the question of separating certain of the liquids—e.g., separate treatment of the waste waters from the breakers and beaters, and also of the machine water—should receive careful consideration, and would probably enable the paper maker to re-use the settled sludge or pulp.

Many paper mills already possess a very large tank capacity, but it is of little use having tank sunless these are properly attended to and regularly cleaned out, and this is where the shoe often pinches. Paper mills produce very large quantities of sludge, and there is little enough room to spare for its reception after removal from the tanks. In the case of mills employing wood pulp, care is usually taken to save any pulp, either for re-use in the same mill, if clean, or for disposal to other mills producing papers of inferior grade. Frequently, when all the waste waters are mixed together, the sludge is pressed and tipped, or simply tipped in the semi-liquid state. Where practicable well drained lagoons assist very greatly in hastening the drying of the sludge, and the objections often applicable to lagooning sewage sludge do not apply so much here.

Some idea of the volumes of sludge produced annually may be gathered from an extract from the evidence of a witness examined by the Sewage Disposal Commission (Seventh Report, vol. iii.). Thus Mr. J. H. Annandale stated that, in his own case, the waste products (from a small mill), consisting of solids from the machines—bleach, lime and carbonate of lime from re-causticising the recovered soda—amounted to something like 3,500 cub. yds. per annum. The sludge, which contains a certain amount of lime, can be used as a manure, but it is sticky and difficult to manipulate.

The writer caused some experiments to be carried out with a view to utilizing paper-mill sludge for raising heat. Esparto sludge was employed, and gave very promising results when carefully dried, but it was found that the moisture in the sludge militated against its employment as a fuel.

The main point in the treatment of waste waters from the majority of paper mills is ample tank capacity, well designed tanks and most important of all, frequent attention for cleaning purposes, without which no system will give good results. The temptation to run tanks for too long periods is, of course, great, since it means less sludge production; but it is bad for the river which receives it. In many trades recovery of what were formerly regarded as wastes is becomming more general, and a manufacturer frequently finds nowadays that in the past he has been throwing away valuable material, the recovery of which not only pays for the cost of recovery, but yields in addition a handsome profit.—Paper Makers' Monthly Journal.

PULP AND PAPER NEWS

Thomas Gibson, of Toronto, has succeeded J. Frater Taylor, as president of the Lake Superior Corporation. He has been a member of the Board for some time, and for several months secretary of the Spanish River Pulp and Paper Mills, with which he became connected through the merger with the Lake Superior Paper Co. Mr. Gibson is highly esteemed in pulp and paper circles, and is looked upon as one of the ablest and soundest officials in the trade.

The annual meeting of the Hinde and Dauche Paper Co., Limited, of Canada, was held at the head offices in Toronto, on January 27. Reports presented for the past year were very satisfactory when everything is taken into consideration and, during the last twelve months, the plant has undergone some extensions, in the installation of a machine for making pasted and fibre board, the capacity being 30 tons per day. It is only a little over a year ago that the new board mill started operations, the machine being 124 inches wide and having a capacity of forty tons per day of jute and chip board. The officers elected were J. J. Dauch, Sandusky, Ohio, President; Ralph King, Toronto, Vice-President; John Watt, Toronto, Treasurer; Sidney Frohman, Sandusky, Secretary; General Manager, O. H. Moore, Toronto.

The Lincoln Paper Mills Company, of Merritton, Ont., held their thirty-seventh annual meeting on February 3. The report submitted to the shareholders showed that, in view of industrial and commercial conditions, the company had made a very fair showing for the year. During the past few months a large sum of money has been expended on an installation for the manufacture of paper, such as grease proof, glassine, etc., heretofore not made in Canada. Some of these goods are now on the market, and other lines will soon follow. Following out the policy adopted some years ago, the usual dividend of six per cent was voted to the employees of the mills on the wages earned by them during the year. The old board of directors was re-elected. The officers are: President, Welland D. Woodruff; Vice-President, A. S. Woodruff; Secretary-Treasurer, William M. Shea.

The Timiskaming and Northern Ontario Railway Commission has issued a writ against the Abitibi Power and Paper Co. of Iroquois Falls, Ont., to recover seven thousand dollars damages for alleged wrongful flooding of the plaintiff's lands.

Recently a large deputation of lumbermen and limitholders from Ontario waited upon the Provincial Government and made several suggestions regarding changes to the Workmen's Compensation Act. The requests were that, in the amendment to the Act, any employer, who failed to make his existence known to the board, should, in the event of an accident to an employee, be forced to pay the whole compensation to the employee. Another suggestion was that an Ontario workman, engaged in Quebec, should not be allowed to sue the company under the Quebec Act when the employer is paying assessments to the Ontario fund. The government promised consideration to the suggestions. Among the members of the deputation were G. A. Gray of the Spanish River Pulp and Paper Mills, H. I. Thomas, representing J. R. Booth, Ottawa, A. E. Craig of the Northern Timber Co., Toronto, Hon. W. C. Edwards, Rockland, and others.

Alex. McIntosh has been appointed representative in Ottawa for McFarlane, Son and Hodgson, the well-known paper house of Montreal, taking the place of R. Tanner, who resigned recently.

During the past year, although the printing and publishing business in Canada was not in as flourishing a condition as in previous years, a review of the trade shows that over a score of new bulidings or important additions to old ones, involving the purchase of new plant, have been erected in various parts of Canada. Of the new buildings in the printing and publishing line, no less than six were constructed in Toronto.

The large, five storey factory of the Rudd Paper Box Company, Toronto, which was completely gutted by fire on January 27, only the walls being left standing, will be rebuilt immediately. The total damage to the stock equipment and building was $175,000, and the insurance was $108,000. A permit has been taken out to reconstruct the factory and work is now under way, showing that the firm lost no time. It is expected that the task will be completed in about six weeks. This will be good news to the 175 hands who were thrown out of employment. One employee, Robert Grimshaw, who was in the cellar of the building at the time the flames burst forth, was unable to escape and his charred remains were found under some debris a few days ago.

The new news print mill of the Brompton Pulp and Paper Co., of East Angus, Que., which started up about the middle of December is now running very nicely. Considering that the company began the erection of the mill in April last, they think that this constitutes a record of putting up a paper mill of the size and getting it under way. The building is of concrete, brick and steel, 466 feet long and 76 feet wide, and is equipped with a 162-inch J. H. Horne and Sons Co. machine, driven by a 700 h.p. four-cylinder Ball engine.

It is expected that the new sulphite plant of the St. Lawrence Pulp and Paper Corporation at Chandler, Que., will be in operation about April 15. The output will be 140 tons daily of strong sulphite pulp, suitable for news, and the mill will supply tidewater paper mills in Canada, United States, England and France.

J. E. Langlois is taking the place of the late J. F. Pendock, Ottawa representative of the Howard Smith Paper Mills Co., Ltd.

The new mill of the Canadian Leather Board Co. at Chambly Canton, Que., which is now in operation, is equipped with four one-thousand pound beaters, two fifty-pound wet machines, one set of forty-eight inch, two roll calenders and one rag cutter. The company dry their product of fibre and leather boards with box dryers. There is one sixty h.p. boiler and the mill is motor driven, individual motors being attached to each beater.

The Standard Paper Co. of Toronto, have been appointed selling agents to Certainteed wall board of the General Roofing Manufacturing Co., St. Louis. This board is wrapped in packages, so that it cannot become damaged at the ends and stands the Mullen test of 424 pounds to the square inch.

It is expected that the new news print mill of the Abitibi Power and Paper Co. will be producing by the end of April. The concrete buildings for the news print plant and the sulphite mill are now completed. The sulphite mill will have three digesters. The two 160-inch machines, which have been built by the Pusey and Jones Co. of Wilmington, Del., are being assembled and, after they are set in operation the third machine, which is 186 inches wide, will be installed and running in July, while the 202 inch machine, being built by Charles Walmsley and Co., of Bury, England, will be going in September next. The total output of news print will be about 230 tons daily when the four units are running to capacity.

It is learned on good authority that the Timiskaming and Northern Ontario Railway has under consideration a plan for the active carrying on of pulp wood operations in Northern Ontario which will materially aid settlers during the present period of depression. J. L. Englehart, Chairman of the T. and N. O. Commission, has had several interviews with Hon. G. H. Ferguson, the New Minister of Lands, Forests and Mines for the Province, and it is understood that the Government will advance two dollars per cord on all pulp wood cut from the property of bona fide settlers. The full details have not yet been arranged but, it is expected that the new plan will come into effect at a very early date. Several rossing machine centres will be established and the settler will be able to have his wood rossed for a very small fee. The Commission will then advance him money upon it and assist him in every way possible to effect a sale for his product. After the timber is sold, the Commission will collect the money advanced from the proceeds. The advantage of the whole proposition is that the settler will have a certain amount of ready cash with which to carry on operations. The Department of Lands, Forests and Mines has endorsed the scheme as being a very practical way to assist needy homesteaders at this particular period.

James Logan, who for the past twenty-two years has been in the service of the Toronto branch of the E. B. Eddy Co., has opened an office in the Day Building, 49 Front Street West, Toronto, where he will be the selling representative of several well known paper Mills. As a mark of appreciation and esteem, the employees of the Eddy Co. presented their retiring manager with a valuable and artistic gold, hunting case, Waltham watch, suitably engraved. The presentation was made in a few appropriate words by Donald McLaren, the new manager of the Toronto branch, and the gift was feelingly acknowledged by Mr. Logan, who referred to the pleasant relations that had always existed among the members of the staff and whose many kindnesses and courtesies he would never forget.

The industries of Thorold, Ont., are busy at the present time, and are looking forward to a prosperous year. The new plant of the Beaver Board Co. is running full time, the product finding a ready sale all over Canada. Until the closing of the Welland Canal a large number of steamers laden with rossed pulp wood arrived from the lower St. Lawrence river ports. The plant is operating night and day. The Ontario Paper Co. also report business good in the news print line and the plant is turning out about one hundred and twenty-five tons per day. The company have a huge supply of rossed pulp wood on hand which is piled up to a great height, and is one of the sights of the town. Lake and ocean steamers arrived weekly during the season of navigation, just closed, with thousands of cords from the Island of Anticosti. The ground wood plants are well employed and also the other new industries of the town. The Exolon Co., manufacturers of artificial abrasives, of which C. J. Brockbank is manager, and the Pilkington Glass Works, which are employing some 150 hands.

MAINE ACTIVELY AT WORK IN PULP AND PAPER EDUCATION.

Canadians, whose interests have been turned to the question of technical education in Pulp and Paper will be interested in recent progress in Maine. To the University of Maine which is located at Orono, Me., belongs the distinction of establishing as a part of its general curriculum a complete course in pulp and paper making and now that Aubert Hall, the new science building, is completed, this course will soon have a complete equipment by which the process of paper manufacturing can be carried from the wood to the finished product. An entire floor in the chemistry department is given over to the course and a digester, beater, bleacher and other equipment up to the paper machine itself is being installed.

Aubert Hall, University of Maine, where first pulp and paper course in America is now established.

The course was started two years ago, and has proven a great deal of value so much so that it is endorsed by some of the leading pulp and paper manufacturers of the country. It allows a young man to specialize in this important industry, and to come out of the university well fitted to take an important position in connection with the manufacture of paper.

The new building is four storeys, practically fireproof, and the interior walls are of brick treated with white enamel. Mill construction has been used for the floors which are of hard pine and oak.

The science department of the University through the co-operation of Roscoe G. Eddy, State Labor Commissioner, is carrying out a plan for extension work among the men employed in the pulp and paper plants in Maine. It is the idea to establish classes at the various manufacturing centres among the men engaged in the industry and to give lecture courses, which will be instructive along the lines in which they are employed.

UNITED STATES NOTES

(Special to Pulp and Paper Magazine.)

Edward M. Hall, general manager of the newly formed Hall Process Company, Watertown, N.Y., has just been notified by the United States Patent Office that his patent on the manufacture of newsprint without the use of sulphite has been granted. The company will now begin the manufacturing under the provisions of the patent, and it is expected to revolutionize the newsprint industry. George C. Sherman, president of the company, in an interview, during the past week, with the press, said: "I have every reason to believe that a much greater quantity of ground wood pulp can be produced with the same power as heretofore used in the old process, and it will be of quality as good as, if ont better than, that now being offered to the trade. The new process of manufacturing newsprint paper from the pulp thus obtained, will not only revolutionize the manufacture of paper, but will greatly cheapen its price as well. This method of manufacture will bear the same relation to the paper making industry as did the roller process to the flour industry."

* * *

The Bear River Paper Company, of Petoskey, Mich., will shortly install a bleaching plant at its mill. This decision was arrived at during a recent meeting of its stockholders. The company has for many years only manufactured wrapping paper, but with the installation of the bleaching plant, it will now be enabled to manufacture the finest grades of bond, flat writing and book papers as well. New machinery is being manufactured especially for the company, and men are at work erecting special tanks, installing numerous fixtures, tearing down old machinery, etc., preparatory to the advent into the new venture.

* * *

The claim of the Battle Island Company of Fulton, N.Y., against the State, amounting to $1,800,000 for damages done when the construction of the barge canal took away the water rights, certain real estate as well as the electric powerhouse owned by the company, will probably be one of the first to be tried before the new Court of Claims, which has just been authorized to act for the State Legislature. No word has as yet been received from Federal Judge G. W. Ray as to his decision as to the confirmation of the application of certain creditors of this company to sell the sulphite plant of the defunct concern at Fulton. Judge Ray promised to make his decision known as soon as he looks over the briefs which have been prepared in the case.

* * *

The American Writing Paper Co., Holyoke, Mass., for the year ended December 31, 1914, reports earnings of $1,253,405, against this were expenses of $411,715 interest on bonds $850,000 and sinking fund charges $100,000, making a debt to profit and loss of $108,310. In its statement the executive committee says: "The year 1914 has proved disappointing in the results shown by your company, due to conditions confronting all manufacturers and particularly those whose business required the importation of any raw material. Just prior to the outbreak of the war there were evidences of a general revival of business, but after war was declared prices of all raw materials advanced abnormally and demand for paper decreased. Our coal consumption has been higher, due to another year of unprecedented low water conditions in the Connecticut River. The bonds of the company, held in its treasury remain unchanged, there being on January 1, bonds of the par value of $1,400,000 which are held as an asset."

* * *

Extensive improvements are being made in the buildings and equipment of the machine department of the S. D. Warren Paper Mills at Westbrook, Me. The building in which No. 1 and No. 2 machines are located is to be enlarged, both in length and breadth, and No. 1 machine is being removed altogether and a much larger machine will be installed.

* * *

To compete with the German and Belgium markets, and to become one of the leading paper centres of this country is the object of the Diamond State Fibre Company, at its plants at Bridgeport and West Consohohocken, Pa. The installation of special machinery for the manufacture of greaseproof and glassine papers has been completed, and between 20 and 30 additional men will be put to work in turning out the new products.

* * *

Alleging a breach of contract, the St. George Pulp and Paper Company, has filed a suit in the common pleas court at Bridgeport, Conn., asking for damages of $1,500 from the Bridgeport Standard, an evening newspaper published in Bridgeport, Conn. The St. George Pulp and Paper Company claims that through the alleged failure to keep the contract, it has lost $1,200. An attachment for $1,500 has been placed on the Standard Building as a result.

* * *

Some valuable information was added to the stock of knowledge of the delegates to the Western Paper Box Manufacturers' Convention at Fort Wayne, Ind., the latter part of January, by several able and interesting papers. Two Cincinnati men, Fred Davenport, who discussed "State Insurance," and Oliver S. Larkey who treated of "Credits," made a deep impression. Mr. Davenport commended the principle of workmen's compensation, and said that Ohio has what is generally conceded to be one of the fairest laws in the country. He gave his hearers a complete history of the law, commenting on its salient features. At the morning session of the convention, reports were read from the Auditing Committee, Publicity, Bulletin and Membership Committees. Papers were read by George H. Tompkins, of Chicago, on "Legislation," George N. Snyder, of Grand Rapids, Mich., on Factory Discipline and Rules. The Accident and Liability Committee and the Cost Committee submitted reports at the afternoon meeting.

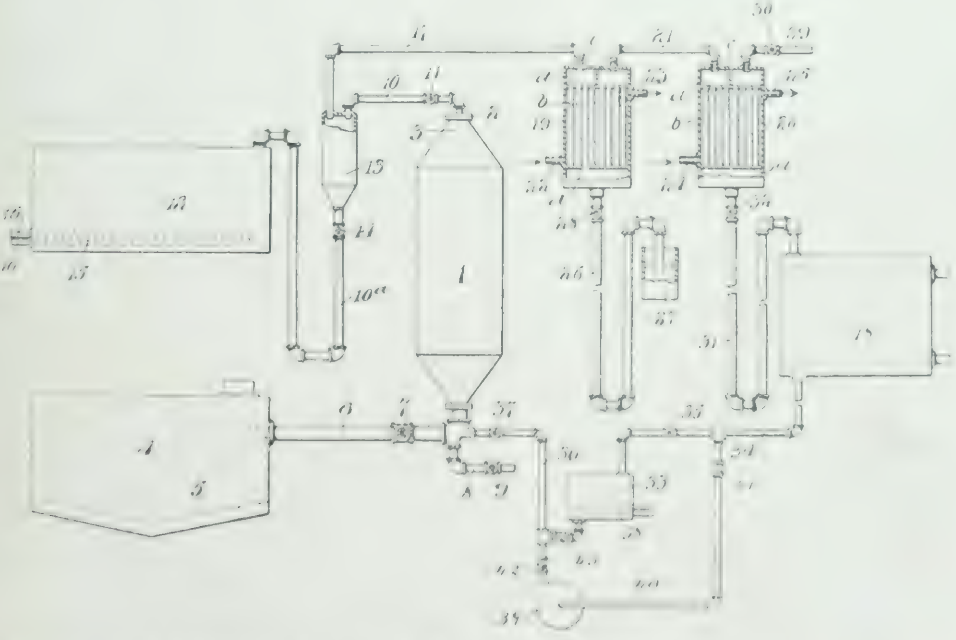
NEW PATENTS

SULPHITE DIGESTING PROCESS.

Hugh K. Moore and Robert B. Wolf of Berlin, N.H. Patentees. Patented in U.S. Patent Office, December 8th, 1914.

Concerning their process for the manufacture of sulphite fibre and the reclamation of sulphur dioxide, the inventors say:

The invention has relation to the manufacture of sulphite fibre and has for its object to produce a greater quantity of fibre from the raw material than heretofore possible, to prevent the weakening and discoloration of the cellulose, to produce a cleaner pulp and one which contains a lower lignin content, to effect a saving in the cost of making sulphite pulp, and otherwise to prevent waste and to increase the efficiency of the process.



Heretofore in the manufacture of sulphite fibre, it has been customary to place the chips and the acid in a digester of well known construction and close the neck thereof, after which steam is injected into the bottom of the digester to bring the contents thereof to the proper temperature. When the pressure in the digester has reached the point at which it is desired to cook the raw material, no more steam can be admitted and consequently no increase in the temperature of the mixture in the digester can be obtained, unless some of the gases or liquor or both are allowed to escape through a relief pipe extending from the top of the digester. According to present methods, the gases are reclaimed by conducting them to a storage tank containing the acid to be used for filling the digesters.

In practicing the method thus briefly described, the inventors say it has been apparent to them that there are several evils which affect the product and the economy of operation. To explain these, it may be pointed out that the acid heretofore employed for cooking the raw materials in the digester consists of a base such as calcium, magnesium (or in some cases sodium) and water subjected to a reaction with sulphur dioxide (SO_2). For instance, in the event that calcium be employed as the base to form calcium bisulphite, the latter may be produced either by the milk-of-lime system or by the tower system. In the former, the lime is suspended in water and sulphur dioxide gas is forced or sucked through it, converting the lime into calcium bisulphite, which in the case of a pure calcium base would be CaS_2O_5, the water absorbing a certain portion of the sulphur dioxide gas and forming sulphurous acid, H_2SO_3, so that the resulting acid consists of a mixture of sulphurous acid, bisulphite of calcium and water.

In the latter, or the tower system, the water is passed over calcium carbonate (in the form of lime rock) and sulphur dioxide is brought into contact with them, so that the resulting lime is dissolved to form first monosulphite of calcium and subsequently bisulphite, and the water takes up a certain portion of the sulphur dioxide and forms sulphurous acid, so that the resultant acid is substantially the same as that produced by the milk-of-lime system. In either case, the acid liquid is weak and free or uncombined sulphurous acid or sulphur dioxide. According to modern methods, steam must be injected into the digester from time to time so that the contents, consisting of the raw material and the acid such as described, may be kept in circulation and the temperature maintained at a point to permit the desired reactions. The effect of the addition of steam, however, is to weaken the acid and to render it necessary to maintain a consequently higher temperature to secure the desired reactions than would be necessary were the acid of original strength. On the other hand, however, even were it possible heretofore to increase the acid strength of the solution, such increase would render it difficult to fill the digesters in the first instance, for the heat of the digesters (resulting from the previous cooking operation) would cause the giving off of sulphur dioxide gas in such quantities as to be extremely dangerous for the operators or workmen in proximity to the digesters and those whose duty it is to place the covers on the digesters after the charging is completed.

In accordance with the present invention, it is possible to secure in the digesters an acid liquor of the desired strength and to maintain it at full strength. The digester in the first instance is charged with raw material and with water, or a solution having a base (e.g. calcium) with which sulphur dioxide may be combined, or the usual calcium bisulphite, and the cover is secured in place. Substantially sulphur dioxide is injected into the digester to bring the liquor therein to its desired acid strength. This additon of the sulphur dioxide, when water, or milk of lime, is the initially introduced liquor, causes the formation of sulphurous acid in the one case, or calcium bisulphite and sulphurous acid in the second case, reactions occurring in the closed digester itself. In the event that the digester be charged with the usual calcium bisulphite, the injection of the sulphur dioxide brings it to the desired full strength, and compensates for the weakneing of the acid liquor by the moisture in the raw material, by the condensation of the steam used in the cooking process, and by the combination of the sulphurous acid with lignin contents of the raw material. While we prefer and recommend that sulphur dioxide be injected either in liquid or gaseous form, yet it will be appreciated that it would not constitute a departure from the invention were the sulphur dioxide, before injection, dissolved or combined in a suitable liquor.

We also provide a continuous process in which the sulphur dioxide gas, which escapes from the relief pipe when the steam is injected into the digester, is reclaimed, converted into liquid form, and again injected into the digester as required. In the reclamation of the sulphur dioxide, it is subjected to cooling or refrigeration to reduce it to liquid form, and it is preferably injected into the digester by heating it until its pressure is sufficient.

On the drawing the inventors have illustrated diagramatically and conventionally forms of apparatus which may be employed in carrying out their process.

The digester is indicated at 1 and is of the usual type having an acidproof lining. The digester is filled with chips or raw material and either with the usual liquor consisting of a mixture of sulphurous acid, bisulphite of calcium and water, or else with a liquor consisting of water or else containing a suitable base which may be formed into bisulphite by the addition of sulphur dioxide (SO_2), such, for instance, as milk of lime. This charge of liquor is introduced into the digester by removing the cover 2 which closes the neck 3.

The digit 4 indicates the usual blowpit which has a false bottom 5 through which the waste liquors are allowed to drain, and the bottom of the digester is connected with the blowpit by the usual blowpipe 6 having the valve 7.

The steam is injected into the digester through a pipe 8 leading from a suitable steam generator and having the usual valve 9. Leading from the neck is the relief pipe 10 equipped with the valve 11.

As thus far described, the apparatus does not differ from that commonly used.

At 12 is indicated a storage tank in which may be contained water, lime water, acid, or other liquid and with which the relief pipe 10 is connected, said pipe being formed in a relatively deep trap or loop as indicated. In the tank 12 may be contained either lime water or else it may be used solely for the purpose of receiving the waste liquors which find their way through the relief pipe 10 when the relief valve 11 is opened to permit the injection of steam. Interposed between the tank 12 and the digester 1 there is the usual separator indicated at 13, the function of which tor is at a sufficient elevation with respect to the tank 12 so that the liquor will flow therefrom to the tank, such flow being controlled or permitted at will by a valve 14 located in the pipe section 10a between the separator and the tank. It will be understood that the valve 14 may be of any convenient form of pressure-regulating valves.

In the event that lime water is placed in the tank 12, it will, because of the introduction of the waste liquor, contain more or less sulphurous acid either free or combined with lime, but, as we have previously stated, in lieu of lime water, we may use water or any solution containing a suitable base corresponding to that employed in the process. In the event that organic radicals such as cymene are carried into the tank 12 by the waste liquor, they will, because of their lower specific gravity, collect on the top of the contents of the tank and subsequently may be removed in any desired manner. From this tank 12 the contents may be subsequently pumpd directly into the digester when it is to be charged anew, and consequently, in order to have the liquor at the proper temperature when it is introduced into the digester, it may be accomplished either by permitting the liquor to remain at substantially the temperature at which it was discharged from the separator previously, or else by heating it by any convenient means, such, for instance, as a steam coil 15 supplied by circulation pipes 16 connected with a suitable steam generator.

For the purpose of reclaiming the sulphur dioxide which escapes into the separator 13 from the digester we connect with the top of the separator a pipe 17, which conducts the gas therefrom to suitable surface condensers or coolers which first separate out the water vapor and organic radicals, such as cymene, pinene, etc., and then condense or liquefy the sulphur dioxide. We employ two condensers—one indicated at 19 and the other at 20. These may be of any suitable or convenient construction. As illustrated, each consists of a cylinder having diaphragms or partitions a a with connecting tubes b. The chamber above the upper partition a is divided by a vertical partition c so that the incoming gas will be conducted downward through one-half of the tubes into the compartment below the lower partition or diaphragm a, and thence upward into the second compartment in the upper part of the cylinder. Between the outlet compartment of the first condenser 19 and the inlet compartment of the second condenser 20 is a pipe or conduit 21 for the gas. The tubes are surrounded by any suitable refrigerating medium (cold water, a salt solution, or a gas expanded from a liquid), the inlet and outlet pipes therefor being indicated at 22 23 for the condenser 19, and at 24 25 for the condenser 20. It will be understood that, in lieu of the particular form of condenser illustrated, any other surface condenser which is suitable for the purpose may be equally well employed.

The cooling medium, which preferably consists of water at the ordinary temperature, is introduced into the condenser 19, and is low enough in temperature to condense, as previously stated, the water vapor, cymene, pinene, etc., which may escape with the other gases from the digester, but not sufficiently low to condense the sulphur dioxide gas. The liquid from the condensed gases in the condenser or cooler 19 is conducted by a pipe 26 to a suitable receptacle 27 from which they may be drawn to be refined, or it may be conducted by said pipe to the storage tank 12. The pipe 26 is shown as bent to form a deep trap and a gooseneck, and its discharge end feeds into the top of the receptacle. The pipe 26 may be provided with a suitable pressure-regulating valve 28. The gas, which escapes from the primary separating condenser 19 through the pipe 21 is conducted to the secondary condenser or cooler 20 and the refrigerating or cooling medium in this condenser is at a sufficiently low temperature to condense the sulphur dioxide or any other gases which it may be desirable to reclaim, the uncondensed gases, such as carbon dioxide, escaping through a waste pipe 29 equipped with the pressure regulating valve 30 to the atmosphere. In practice, the condensation or liquidification of the sulphur dioxide may be accomplished in the secondary condenser by subjecting the gas to pressure by means of a compressor, in which event the water or other cooling medium need not be lower than 60 deg. F. to 70 deg. F. The liquid formed by condensed gases collecting in the bottom of the condenser 20 is conducted by a pipe or conduit 31 which is bent in the form of a U trap of considerable depth to a storage tank 18. The pipe is provided with a suitable pressure-regulating valve 32.

The storage tank may be refrigerated by any suitable means to reduce or maintain the temperature of the liquefied sulphur dioxide to a point approximately 10 deg. F. or below. It may also be necessary in some cases to refrigerate the liquefied sulphur dioxide before it enters the tank 18.

In order to utilize the condensed sulphur dioxide in the storage tank, a measuring tank is employed which is indicated at 33 into which the liquid sulphur dioxide may be conducted by gravity through a conduit 34 equipped with a valve 35. From the bottom of this measuring tank a pipe or conduit 36 leads to the bottom of the digester 1, said pipe or conduit being provided with a controlling valve 37 in proximity to the digester.

The inventors point out that while they have shown only one digester and a single conduit 36 it will be understood that the measuring tank may discharge into any number of digesters and that the digesters will be connected by conduits as at 17 with the condensing and cooling apparatus previously described. The sulphur dioxide may be injected into the digester by a pump to which the liquid dioxide is supplied from the tank, but in practice we prefer to inject the dioxide in the form of liquid and gas by the pressure of the dioxide gas in said tank.

Any suitable means may be employed for heating the liquid sulphur dioxide in the measuring tank to raise it to a pressure sufficient to permit it to force the liquid and gaseous dioxide into the digester, and for this purpose there are shown steam heating coils 38 connected by circulating pipes with any convenient steam generator. By means of the coil 38, the liquid SO_2 is converted into a gas and the pressure in the chamber 33 is sufficient to force the liquid into the digester when desired. On the drawing, they have illustrated a bypass around the chamber 38 including a pump 39 and a pipe 40. This by-pass is provided with valves 41, 42, so that it may be cut out when desired. The pipe 36 has a valve 43. By closing the valves 35 and 43, the liquid SO_2 may be caused to pass into the chamber 33 and then heated sufficiently so that the pressure in the chamber 33 will force the liquid SO_2 into the digester. The pressure-regulating devices or valves which are utilized in the reclamation system may be set to keep the pressure in the condensers as high as possible without interfering with the relieving of the digesters, thereby permitting us to use a cooling medium at as high a temperature as possible, so that while the sulphur dioxide is ultimately condensed, nevertheless its temperature is not greatly less than that required for its condensation.

From the foregoing description, it will be seen that we have provided what may be regarded as a continuous process so far as the sulphur dioxide is concerned, in that the escaping sulphur dioxide gas is separated from the other gases, liquified, and again used. It is not at all essential that the injection of the sulphur dioxide should be intermittent as we have described, because we have contemplated the continuous injection of the sulphur dioxide into the digesters during the cooking process. In many cases, a single injection of sufcient quality into the closed digesters is all that will be required. In actual practice we charge the digester with the raw material and the liquor, after which the cover is secured in place. Then a sufficient quantity of sulphur dioxide is injected, after which the relief valve is opened to permit the escape of the air which collects above the charge. Then, after a period of about an hour, during which time the acid permeates the raw material, steam is slowly injected from time to time (with more injections of substantially pure sulphur dioxide if desired) until the cooking is completed. During the cooking, the pressure at the top of the digester is approximately 70 pounds per square inch.

Some of the advantages of the new process are set forth by the inventors as follows:

In the first place, a much stronger solution of sulphur dioxide can be obtained by introducing it into a preferably closed digester during the cooking operation, or before it begins, than by the present known methods for the following reasons: It is impossible, as previously stated, to keep a strong solution of sulphur dioxide under atmospheric pressure because the solution becomes saturated before the desired cooking strength is obtained. On the other hand, if the temperature is reduced sufficiently to get a greater strength of solution, a large part of the gas is lost by the increase in temperature which takes place when the acid is introduced into the digester, since the digester is necessarily hot from the previous cooking; second, because the gain is further offset by the diluting effect of the larger amount of steam which is condensed in order to bring the liquor to the desired temperature for cooking; and third, because the strength of the solution is weakened by the combination of the sulphurous acid with the lignin content of the raw material. Moreover, it is necessary to have the cooking acid at a relatively high temperature when the digester is first filled in order to cook quickly and well, and the impossibility of obtaining this, except in accordance with the present invention, is obvious for the reason that the retaining power of the solution can only be increased at a given desired temperature by increasing the pressure. In accordance with the present process, however, the milk of lime or the water (in the event that water alone be used) can be introduced into the digester at as high a temperature as desired. When the sulphur dioxide is injected, it is possible to secure a stronger sulphur dioxide solution in the digester throughout the cooking than has previously been attainable.

Another point of advantage flowing from the present method is that the sulphur dioxide, which is introduced during the cooking, replaces that which escapes through the relief valve as the latter is opened from time to time to allow more steam to enter the digester for the purpose of maintaining the temperature and securing the necessary ebullition and circulation. There is, however, a further benefit, to which we may advert in this connection, to wit: That, by securing a solution in the first instance in the digester of the greatest possible strength, the cooking may be carried on at a lower temperature at given pressures than heretofore, and this tends to prevent the decomposition of the cellulose, while at the same time the lignin and cementing materials which hold the fibres together are more effectively removed. In the method now in use, on the contrary, because of the relatively weak acid, high temperatures are required and a considerable portion of the cellulose is decomposed or changed into organic compounds, and the cellulose which is not decomposed is, because of said higher temperature, weakened and made darker in order so as to cause the deterioration of the resulting fibre.

A most important advantage gained from the practice in the herein-described method is that a larger amount of fibre can be produced from a given amount of raw material than has been possible with prior processes. Moreover, a cleaner pulp will be produced, for the reason that a concentrated solution of acid exerts a higher osmotic pressure and penetrates such close-grained portions of the raw material as knots, bark, etc., which will have a higher lignin content and have more extraneous matter than is contained in the average of the raw materials. By reason of the penetration of the acid, when the temperature is sufficiently raised, it results in the cooking of the material into a more nearly white product which is mainly cellulose. As a further result, the screenings so called, which are rejected in the regular process of refining the pulp, are greatly decreased.

Inasmuch as the result of the process is a pulp which contains lower lignin content, that pulp which is afterward bleached requires a smaller consumption of the bleaching agent, and can be bleached at lower temperatures, thereby effecting a saving in fuel. The bleached pulp is also stronger and whiter, and there is les sloss of fibre in the bleaching process. It hardly need be suggested that inasmuch as the process is carried on at lower temperatures than heretofore, material saving in the consumption of fuel is effected.

CONVENTION WEEK IN NEW YORK.

(Special to Pulp and Paper Magazine.)

New York, February 12, 1915.

The thirty-eighth annual convention of the American Paper and Pulp Association will be held in this city beginning next Tuesday, February 16, and concluding on Thursday night, February 18th with the usual banquet. As heretofore, the convention meetings will be held in the rooms of the Waldorf-Astoria Hotel, Thirty-Fourth Street and Fifth Avenue. So many changes in the general business tisuation that directly affect the paper industry in this country during the past year, that it is expected the convention this year will be attended by a larger number of paper manufacturers than ever before. Tuesday and Wednesday will be devoted to divisional meetings, and the general session will be held on Thursday morning when each division will make its report before the entire body. Several interesting and instructive features have been embodied in the programme of the general session, and numerous papers will be read.

The tentative programme for the three days follows:

Tuesday, 2.30 p.m.—Meeting of the Cover Paper Division in the White and Gold Room, and meeting of the Test Board Division in the State Apartment.

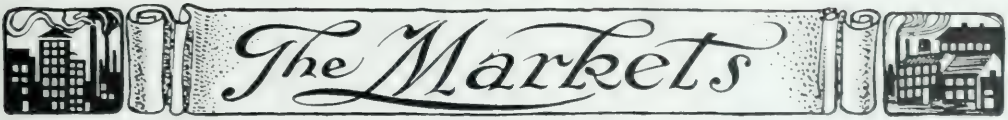
Wednesday, 10 a.m.—Meeting of the News Print Division in the East Room, meeting of the Wrapping Paper Division in the Myrtle Room. and meeting of the Writing Paper Division in Room 151.—2.30 p.m., meeting of the Board Division in the East Room, and meeting of the Tissue Paper Division in the Myrtle Room.

Thursday, 10.00 a.m.—Myrtle Room, General Meeting of the Association. The session will be taken up as follows. Reading of the minutes, annual report of the president, annual report of the secretary, annual report of the treasurer, appointment of Auditing Committee, appointment of Nominating Committee, report of Committee on Resolutions, miscellaneous business, address by Frank Stockdale of Chicago, Ill.—"How to Keep with Rising Costs," discussion, recess. An adjournment for the recess is scheduled for one o'clock. The afternoon session begins at 2.15 p.m. with a motion picture exhibit in the Astor Gallery, following which this routine will take place in the Myrtle Room: Address by John H. Fahey—"The Federal Trade Commission, Its Opportunities," discussion; address by Edward T. Trefz—"How to Keep Members Interested," discussion, report of the Nominating Committee, election of officers, and adjournment. The annual dinner will conclude the convention. It will be held in the banquet hall of the hotel at seven o'clock.

The National Paper Trade Association will also hold its annual convention in New York at this time, beginning next Monday, and concluding on Wednesday night with its baquet. This convention will likewise be held at the Waldorf Astoria Hotel.

Mr. G. A. Ramsay who has been engaged in the building of the pulp and paper mills for the Bathurst Lumber Company at Bathurst, N.B., is now in Montreal superintending the installation of the machinery at the Forest Products Laboratories.

The heavy snow storm of last fortnight, which was general all over eastern northern Maine, proved to be a God-send for the big pulp and paper concerns of that State. A foot of snow is reported at Ripogenus and about that depth in various other sections. Excellent conditions for hauling logs now prevail.



The Markets

CANADIAN MARKETS

The newsprint situation is easing off some, and prices are a little weaker. Some of the Canadian plants, which have been operating several months to the limit, are not so rushed now. The reason for this is easily explained. There are not so many war extras issued, advertising has fallen off by thirty to forty per cent in many cities and, owing to the higher cost of producing newspapers, some Canadian dailies, particularly in the west, which have been issuing "double headers" every day—that is morning and evening editions—have recently announced that they will print only one paper. Since the war broke out and the financial depression felt, four daily papers in the West have ceased publication, two have dropped their morning editions, and one or two more their evening issues. The result is that, with the decreased size of the dailies generally, and the decimated number of newspapers, the demand for news is falling off somewhat. Like other institutions the publishers are feeling the effect of war times, but they are not down-hearted. The demand from across the border is also diminishing for the same reason. Several contracts are now being renewed at the old figures.

In book and writing, bond and ledger, orders for the better grades are very good, owing to many banks and other institutions holding annual meetings and printing financial statements, reports, etc. The mills are not operating to capacity by any means, but January is always a quiet month, and is more so than usual this year. Orders are smaller and business harder to secure. The mills are running on an average about five days per week. Wrapping paper business is only fair, and jobbers report that the market is rather quiet. With the advent of spring trade, the requisitions for the different lines are expected to pick up. Paper bags are again away off, and a variety of discounts is being quoted from list prices in order to secure business. Some new lines of paper such as glassine, greaseproof, and parchment will be put on the market by Canadian mills in a few days, of which due announcement will be made. In the envelope line things are picking up and manufacturers of papetries, fancy stationery, etc., are getting their samples ready for the next holiday season and will send out their salesmen this month. Collections are reported as slightly improving in Ontario but in the West there is no change. Coated paper plants are fairly busy while the demand for kraft keeps up well.

Bleached sulphite is in rather poor demand, while the market for easy bleaching has been weak of late. There has come on the market in Canada quite a lot of extra tonnage from new plants, and paper mills are securing their supplies, on monthly contract basis, at about the same figure as formerly prevailed. Ground wood conditions keep up very well, and supplies are fairly large, but little new business, outside of contract, is reported. All grades of all waste papers are dull and mills are making only light purchases of paper stock. It is expected that several lines will pick up some during February, but meanwhile most concerns are now marking time.

Quotations, f.o.b. Toronto, are:—

Paper.

News (rolls), $1.95 to $2.05 at mill, in carload lots.
News (sheets), $2.10 to $2.15 at mill, in carload lots.
News (sheet), $2.20 up, depending on quantity.
Book papers (carload), No. 3, 3.75c. to 4.25c.
Book papers (ton lots), No. 3, 4c. to 5.50c.
Book papers (carload), No. 2, 4.25c.
Book papers (ton lots), No. 2, 4.50c. to 5.25c.
Book papers (carload) No. 1, $4.75 to $5.25.
Book papers (ton lots), No. 1, 5.25c. to 6.00c.
Writings, 4½c up.
Sulphite bond, 6½c. to 7½c.
Grey Browns, $2.35 to $2.75.
Fibre, $3.35 to $4.00
Manila, B., $2.85 to $3.25.
Manila, No. 2, $3.10 to $3.50.
Manila, No. 1, $3.35 to $4.00.
Unglazed Kraft, $3.90 to $4.50.
Glazed Kraft $4.25 to $5.00.

Pulp.

Ground wood pulp (at mill), $17.00 to $18.00.
Ground wood, $22 to $24, delivered.
Sulphite (unbleached), $39 to $43 del. in Canada.
Sulphite (unbleached), $40 to $44, delivered in U.S.
Sulphite (bleached), $54 to $58.
Sulphite (bleached), $54

Paper Stock.

The market in the rag and paper stock line has not opened up as yet, and mills are buying in limited quantities. Mixed papers are very low in price, and folded news is also quiet. Over issues are selling fairly well, but the figure is said by dealers to be away below what it ought to be:

No. 1 hard shavings, $2.05.
No. 1 soft white shavings, $1.80.
No. 1 mixed shavings, 50c.
White blanks, 95c.
Heavy ledger stock, $1.50.
Ordinary ledger stock, $1.25.
No. 2 book stock, 50c.
No. 1 book stock, 80c.
No. 1 Manila envelope cuttings, $1.20.
No. 1 print Manilas, 70c.
Folded news, 30c.
Over issues, 40c.
No. 1 cleaned mixed paper, 25c.
Old white cotton, $2.50 to $2.75.
No. 1 white shirt cuttings, $5.75 to $6.00.
Black overall cuttings, $1.70.
Thirds, blues, $1.50.
Black linings, $1.75.
New light flannelettes, $5.00.
Ordinary satinets, $1.00.
Flock, $1.10.
Tailor rags, 90c.
Manila rope, 2¾c to 3c.
No. 1 burlap bagging, [illegible]

Quotations f.o.b. Montreal are:—

Book—News—Writing and Posters.

Roll News, $40 to $43 per ton for large orders, $45 to $50 per ton for small orders.

Ream News, $45 to $47 per ton for large orders; $50 to $60 per ton for small orders.
Cover Paper 5½c. to 7c.
No. 1 Book, 5¼c to 6c per lb.
No. 2 Book, S.C., $4.50 to $4.75 in large quantities; $4.75 to $5.50 in small quantities.
No. 3 Book, M.F., $4.00 to $4.25 in large quantities; $4.40 to $4.50 in small quantities.
Writings, 5c to 7½c.
Sulphite Bond, 6½c to 8½c.
Writing Manila 5c.
Colored Posters 4c. to 5c. per lb.

Wrappings.

Grey Brown, per 100 lbs., car lots, $2.25 net; 5 tons $2.45; 2 tons, $2.55; 1 ton, $2.65; less, $2.75.
Red Brown, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, 3.15; less, $3.25.
B. Manila, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, $3.15; less, $3.25.
No. 2 Manila, car lots, $3.10; 5 tons, $3.20; 2 tons $3.30; 1 ton, $3.40; less, $3.50.
No. 1 Manila, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton, $3.65; less $3.75.
Kraft, $3.75 to $5.00.
Fibre, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton $3.65; less $3.75.
Fibre, $2.75 to $3.50.
Manila, B., $2.50 to $3.25.

On large orders to the jobbing trade some manufacturers are quoting 10 per cent off the above prices on wrapping.

Pulp.

Sulphite easy bleaching, $43 to $45 per ton.
News quality, $41 to $42 per ton.
Bleached sulphite, $54 to $59 per ton.
Kraft pulp, $3.60 to $4.00.
Ground wood, No. 2, $22 to $24, delivered United States.
Ground wood, No. 1, $15 to $16.

NEW YORK MARKETS

(Special to Pulp and Paper Magazine.)

February 13, 1915.

Heavy rains in the past two weeks have been the chief factor in the easing of the ground wood pulp market. Paper mills operating their own ground wood mills have not been buying in the past two or three weeks, as they have had plenty of water with which to operate their own pulp mills. The interval was marked by some easing in the price of both Number 1 and Number 2 pulp. This is chiefly because grinders have sold on contract until late in the spring or early summer for all their output, or at least a large percentage of it, and mills under contract have suspended shipments, causing a small accumulation. The year began much more favorably to the grinders than did the one just passed. In January, 1914, there were at least 100,000 tons of ground wood at producing and consuming points. This year began with practically no stocks on hand.

Packers and dealers in old waste papers do not give very encouraging reports on the market for their stock. There is a very large accumulation of some of the lower grades and the market for them is utterly demoralized. Prices are very weak for such descriptions as old newspapers and mixed papers. The market to-day for mixed papers is about 20 cents a hundred, and the cost of packing is greater than this. It is said that the shippers of this stock have been losing an average of $4 a ton on all goods shipped. Old Mansilas are in as poor demand as mixed papers and news. Both No. 1 and No. 2 are in poor demand and very weak in price. Shavings have gone down in price, but the market is not demoralized. The only reason is that this grade of stock is rather scarce. Flat stock and ledger stock have been in normal demand, and the price has been fairly firm.

Pulps.

Ground Wood, No. 1, $20 to $25.50, delivered.
Ground Wood, No. 2, $17.50 to $20, delivered.
Unbleached Sulphite, dom., 2.02½ to 2.25, delivered.
Unbleached Sulphite, imptd., 1.80c to 1.95c, ex dock, New York.
Bleached Sulphite, domestic, 2.05c, delivered.
Bleached Sulphite, impt., 2.75c to 2.90c, ex dock, N.Y.
Easy Bleaching, impt., 2.05c to 2.15c, ex dock, N.Y.
Unbleached sulphate, impt., 1.95c to 2.05c ex dock N.Y.
Bleached sulphate, impt., 2.80c to 3.00c, ex dock, N.Y.
Kraft Pulp, 1.95c to 2.05c, ex dock, New York.

The market for all grades of paper has been rather quiet during the interval, although the reports on all sides show that there is a strong underlying tone to the market. Mills and jobbers reported that they had taken more orders in the past two weeks than they had seen since the early part of last spring, with the possible exception of the war boom. Prices in all grades have begun to show a little strength with the exception of board, which is demoralized. The board market has been cut to pieces. Prices are as low as $23 a ton for news board and correspondingly lower for the other grades. Chip and straw board are extremely low. The newsprint market has undergone little change. There has been a normal movement on contract and a fairly steady demand for transient roll supplies and sheets. The demand for side runs has been so poor that few mills are running this stock up at the present. The market for fine papers has shown considerable improvement, but it is nowhere nearly normal. Prices are firm, but most orders are being delivered on stock that was run from raw materials bought during the paper stock boom last August.

Paper.

Quotations unchanged for all grades of paper:—
News, rolls, transient business, $1.95 to $2.05 f.o.b
News, rolls, contract renewals, $2.05, f.o.b.
News, side runs, 2.05 to 2.10, f.o.b. New York.
News, sheets, 2.20 to 2.30 f.o.b. New York.
Book papers, car lots, M.F.S., $3.75 to $3.90 f.o.b.
Writing paper, superfine, 13¾c to 17c, del. east of Miss. River.
Writing paper, extra fine, 11c del. east Miss R.
Writing paper, No. 1, fine, 9c, del. east Miss. River.
Writing paper, No. 2, fine, 8c del. east Miss. River.
Writing paper, engine sized,5c to 8c, east Miss. R.
Bond paper, 5½c to 24c, delivered east of Miss. R.
Ledger paper, 8½c to 30c, delivered east of Miss. R.
Linen paper, 8c to 18c, delivered east of Miss. River.
Manila jute, 4¾c to 5¼c, delivered.
Manila, wood, 2.65c to 3.25c, delivered.
Kraft, No. 1, $3.60 to $4.00 f.o.b. New York.
Kraft, No. 2, $3.35 to $3.60 f.o.b. New York.
Boxboards, news, $23 per ton, delivered.
Wood pulp board, $40 per ton, delivered.
Boxboards, straw, $21 per ton, delivered.
Boxboards, chip, $22 per ton, delivered.
Tissue, fourdrinier, 50c f.o.b. New York.
Tissue, white, cylinder, 42½c to 45c, f.o.b. New York.

Pulp and Paper Magazine

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Closer Together

Since this magazine last appeared, there have been gatherings of pulp and paper manufacturers which will go down in history as turning points in the industry.

On February 12th in the Chateau Laurier there was held the Second Annual Meeting of the Canadian Pulp and Paper Association. This was from every standpoint the most satisfactory meeting of Canadian pulp and paper interests on record.

At the luncheon of the Association, President Carl Riordon made a very brief speech which contained this thought: "I think that we should not let this occasion pass without remarking that this Association has now passed the turning point to success. We have taken root and we shall grow."

On February 17th, 18th and 19th the Thirty-Eighth Annual Meeting of the American Pulp and Paper Association was held in New York. The sentiment there, accompanied by the speech of President Moore, ran with paralleling the feelings of the Canadian meeting: "If the history of this Association is ever written, the past year will be the reconstruction period. All associations and organizations arrive at this time, sooner or later."

These two statements representing the feelings of all America so far as pulp and paper industry is concerned are full of promise and inspiration for the future. There never has been a time when strong co-operation and stable development of association work was more necessary than at the present. If as the presidents of the two associations say, associated effort is getting a firm basis now, then the industry can look forward with high anticipation to the days to come.

No one who attended the meetings of these two associations could fail to be struck by the earnestness which was shown in an effort on the part of each manufacturer to get closer to his fellow and to join together to promoting common ends.

Emphasis was laid throughout upon the value of exchange of information of all kinds so that the industry should be placed upon a strong basis. Statistical work of both Associations has shown in the past that there is great profit in store for those who put their hearts into such activities. One of the best indications that manufacturers are getting closer together was the wish expressed by many individuals, that a uniform cost system should be installed throughout the industry in order that manufacturers could make comparisons which would detect leakages and eradicate insidious losses.

Such a move will require a great deal of work and application to have it established firmly. It would be the means of raising the pulp and paper industry to efficiency of the highest order.

No more perfect degree of co-operation could be imagined than that existing between the Canadian and American manufacturers. Unfortunately it was not possible for any American manufacturers to be present at the Canadian meeting but numerous Canadians journeyed to New York to take in the big meeting there. On this occasion every individual from this country was received with a degree of hospitality which can hardly be described. Not only did this apply to the social end of the Convention but in matters of business it is understood that the American manufacturers did everything to make Canadians feel that no obstacles would be raised to hamper Canadian Industry. This harmony is cause for great congratulation to manufacturers of both nations. The ability to forget the boundary line and to fraternize in this way speaks eloquently for the stability of the industry and the foresightedness of the men connected with it. It is only right and proper that the manufacturers included in the American Pulp and Paper Association should receive some such assurance as the Pulp and Paper Magazine is able to afford that their friendliness is reciprocated most warmly by Canadian pulp and paper men.

In inaugurating technical sections both Associations have made immense gains. The well-organized business is the well-balanced business, with due emphasis laid upon all essential parts. Heretofore the paper associations have discussed principally markets, trade customs, legislation and other kindred topics. Co-operation in the business end of the industry excellent in itself, is only a part advance.

The success which has attended it, serves to point out more clearly the advantages to be secured through co-operation in that department which can quite properly be designated the basis of all. With the growth of experimental work, the development of systems of scientific management and accurate methods, the need for an exchange of technical ideas has come prominently to the fore. It is quite safe to say that through associated effort among technical staffs, methods can be evolved and economies can be effected to an extent which will make a very appreciable increase in the dividends of pulp and paper concerns. Further, there is opened up to the technical men the inestimable pleasure of working along with one another.

The world of science knows few boundaries, and it is indeed good that those limitations of hard competition, distance and reserve which have sometimes existed are now likely to disappear in the new "camaraderie." The world of technical enterprises is not one of dark trade secrets, but of shining knowledge. Nature, with all her wonderful phenomena is the one from whom papermakers should endeavor to wrest answers to the question of how to reduce expense and increase efficiency. The more that men can learn about the basic principles of paper manufacture the further they can advance the efficiency of their plants, and as knowledge and skill increase, profits will certainly increase also. It is pleasant to feel "at home" with one's neighbor. Such a condition will undoubtedly be generated by the interchange of ideas in the technical sections.

The "get-together" spirit is likely to be seen in other directions as time goes on. Edward F. Trefz counselled the members of the American Association to make use of the inspiration which association gives, and to build strong national institutions. President Frank L. Moore counselled every manufacturer of paper, whatever his particular line, to be interested in the stable market of all other lines, and President Carl Riordon brought up in the business meeting of the Canadian Association the question of exchanging statistics with American and Scandinavian manufacturers. There was evidenced on all sides the spirit ot broad interest in the welfare of others.

There has come from a man of high standing and long experience in paper making a suggestion for future co-operation which is worthy of the highest praise, and the most careful consideration. If it could be carried out in Canada, it would have a peculiarly salutary effect. It might easily bring order out of chaos, and confidence out of mistrust. It would, at least, bring into existence a knowledge and sympathy never before seen.

The proposal is that to the annual meeting of the association there be invited two or more of the larger shareholders of each company who do not hold office. A day's, or even half a day's, meeting and acquaintance with those men who are charged with the care of invested capital in all parts of the country would give to the investors an entirely new light upon the pulp and paper industry. Confidence, that broad solid basis on which association activities can be firmly established, would be begotten between the men who supply money for developments and the men who take the responsibility of handling the funds.

Some such a plan as the above would appear to be the next logical step in bringing together all those connected with the industry. It would make easy the way of good, sound enterprises, and would eliminate many of the financial troubles which are sometimes foisted upon a perfectly sound industry.

Wherever there is an oportunity to allow the light of knowledge to spread and the influence of confidence to make itself felt, all pulp and paper men should seize upon it. Confidence will prove the firmest foundation in times of stress and will give the industry its proper status in the field of investment.

Convention Comment

At the Canadian Association Convention the Forest Products Laboratories were prominent. The speeches of Hon. Dr. Roche, Minister of the Interior; R. H. Campbell, Dominion Director of Forestry, and Dr. J. S. Bates, at the evening meeting, as well as Dr. Bates' constructive work in the Technical Section, all called forth the most hearty approval of the work of the institution. It is, perhaps, not generally known that in the face of heavy drains of all kinds upon the national purse, the appropriation for the Laboratories not only was not reduced, but was increased by about fifty per cent. This will indicate to those who have not followed the Laboratories closely just how important in the work of building up Canadian industry this experimental work is considered. The Minister, Director, Superintendent, and all the staff, may rest assured that the pulp and paper manufacturers are fully appreciative of their efforts.

SECOND ANNUAL MEETING OF THE CANADIAN PULP AND PAPER ASSOCIATION

Gathering in Chateau Laurier, Ottawa, Marks Great Advance in Canadian Industry.

For genuine interest, enthusiasm and results accomplished, the Second Annual Meeting of the Canadian Pulp & Paper Association held at the Chateau Laurier Ottawa, on Friday, February 12th, constitutes a record. It was a clean-cut progressive meeting brim-full of good spirit and good fellowship. On account of the war the arrangements were of a quiet and conservative nature, but the gathering itself far more than made up for any lack of outward display.

At 9.45 a.m. President Riordon called the meeting to order in the Banquet Hall. There were present, in addition to those whose names appear in the list of the Technical Section given elsewhere, representatives of the following firms:—

Riordon Pulp and Paper Co., Montreal—T. J. Stevenson, Carl Riordon.

Laurentide Co., Ltd., Montreal—J. H. A. Acer, A. D. Huff.

Provincial Paper Mills, Montrose Division—I. H. Weldon.

Howard Smith Paper Co., Montreal — C. Howard Smith.

Don Valley Paper Co., Toronto—Thos. Gain.

Interlake Tissue Mills, Ltd., Merritton—George Carruthers.

Toronto Paper Mfg. Co., Cornwall—W. J. Wallace.

The Bronson Company, Ottawa—Frederic E. Bronson.

Spanish River Pulp and Paper Mills, Ltd., Sault Ste. Marie—[illegible] H. L. Jones.

Riviere du Loup Pulp and Paper, Fraserville, Que.—K. L. Warren.

Dryden Timber and Power Co., Dryden, Ont.—J. [illegible]

J. R. Booth, Ottawa—H. R. Erskine, H. I. Thomas.

The Beaver Board Co., Thorold and Ottawa—Wm. F. [illegible]

Barber Paper and Coating, Georgetown—G. E. [illegible]

Ed. Partington Pulp and Paper, St. John, N.B.—[illegible] Jones.

Kinleith Paper Co., Toronto—W. P. Gundy.

E. B. Eddy Co., Hull, Que.—C. M. [illegible]

Bathurst Lumber Co., Ltd., Bathurst, N.B.—A. G. McIntyre.

Gummed Papers, Ltd., Brampton, Ont. — W. J. [illegible]

The minutes of the last Annual Meeting were read, and approved. The Secretary then outlined the work of the past year of the Association along the following lines:—

Executive Committee.

Following the annual meeting on February [illegible], 1914 the Association proceeded upon its work of holding the organization down to fairly nominal activities on account of the fact that funds were not very plentiful and that some of the larger firms had not yet come into the Association.

Executive meetings were held upon April 23rd, at which time the members of the Executive discussed the interview which had been held with the Minister of Finance with respect to the duty on bleach. The proposed reduction of duty on sulphite was also discussed.

On September 9th, a meeting was held in Montreal at which the main item of business was the nomination of a Sub-Committee on Statistics. This sub-committee held a couple of meetings and on November 18 reported to the Executive that immediate action should be taken upon the collection of statistics in the News Ground Wood and Sulphite Divisions, and that Roy Campbell, Editor of Pulp and Paper Magazine, be appointed Secretary of the Asociation in place of Mr. H. I. Meldrum, who found his other duties too pressing to permit of his occupying the position any longer.

The Secretary and President thereupon took up the work of preparing forms for the collection of statistics and by the end of October sent out forms inviting the members of the three sections above named to participate in the collection of statistics of production, stocks, shipments and commitments. The first month's returns were very satisfactory, there being reported on the basis of total monthly capacity in the Dominion, outside of British Columbia, in the Ground Wood section 74 per cent, in the News section 82.4 per cent and in the Sulphite section 90.2 per cent of the total capacity.

Aggregates were sent out to firms supplying statistics in accordance with the nature of the information which they gave. These percentages showed an increase in the month of December, when the Ground Wood figure was raised to 84.2 per cent, the News to 90 per cent and the Sulphite to 100 per cent.

Book and Writing section began their statistics in December, and secured a report on 77 per cent of capacity in the Dominion.

Efforts are under way at the present time to secure the statistics of the Sulphite division and the board and writing sections will be reorganized as soon as the demand arises.

During the year the Association saw a distinct increase in membership. There are now on the roll 34 firms representing about 75 per cent of the total tonnage in Canada. It is hoped and expected that the membership will increase notably in the near future.

In addition to the statistical work and membership campaign two notable things have been achieved by the Association. The first was an interview of the Book and Writing section with the Minister of Finance on January [illegible], setting before him the claims for greater recognition in the matter of protection. To the delegation the Minister gave his close attention, and it will be known through the medium of the Budget just what success the representations of the papermakers have achieved.

On January [illegible] there were held three meetings in the Board of Trade, Montreal, to consider the question of the proposed increase of 5 per cent in international rate from Canada to the United

States and for export, published by the Canadian Railways to become effective on February 15. The upshot is known to all you gentlemen.

On January 13th, the President instructed Mr. C. Howard Smith and the Secretary to interview the Minister of Customs with respect to the Customs classification as had been decided upon by the Executive at a former time. The proposed classification being based upon the opinion of the various members of the Industry as expressed in the forms which were sent out to them on this matter and the expert opinion of Mr. J. R. K. Bristol, Tariff Expert of the Canadian Manufacturers' Association. These representations would be given the closest attention, according to the Minister.

CARL RIORDON, Retiring President.

The work of the Association seems to be progressing most favorably and there is undoubtedly a magnificent opportunity for more effective work still to be accomplished. When the Association secures the co-operation of the 37 mills who have not yet come in, it will be seen how useful it can become. One good argument which can be advanced in inviting these mills to come into the Association, is that uniform action on the part of the industry is of far greater value to the smaller mills than to the larger ones. Hence they should see their way to come in.

The Financial Statement showed the Association to have a surplus. It was decided, however, to raise the annual fee and to derive the income in part from a system of assessments upon tonnage.

The exchange of statistics with other national associations, the formation of a Transportation Committee and the formation of new sections were then discussed. Action was left with the various sections, and the Executive. The Constitution was amended in accordance with the recommendations of the Executive.

Mr. F. W. Wegenast, of the Canadian Manufacturers' Association, gave an illuminating outline of the tion Act. It was decided, after discussion, to form features of the new Ontario Workmen's Compensa- a safety Association in the Province of Ontario, and for this purpose Messrs. W. P. Gundy, C. H. L. Jones, J. H. Weldon, H. R. Erskine and Carl Riordon undertook an application for incorporation without share capital under the laws of Ontario, Mr. Wegenast drawing up the document.

The meeting then divided up into the various sections, which discussed their own individual affairs.

At one o'clock, all met in the Ladies Cafe.

Forty-five delegates in all sat down to the hospitality of the famous hostelry. With President Riordon was Mr. R. F. Stupart, Director of the Meteorological Services, Toronto, who had made a special effort to come to the Convention to deliver an address.

After luncheon, President Riordon addressed the gathering in a few words. He said: "The sight of such a representative gathering for the Canadian Pulp and Paper Association must give us all heart for the future. I don't think we should let this time pass without observing that we seem to have passed the turning point. We have taken root, and we shall grow. The time for doubt concerning the future of the Association seems to be past, and I think we can all joint together in our work with the full assurance that we are going to progress.

We have the pleasure of having with us to-day Dr. Stupart, and I am going to ask him to address us on the subject of vital importance to all manufacturers dependent upon water power, namely meteorological influences. Mr. Stupart has been very kind to the Association in the past, and his address here to-day is, indeed, a favor to the Association."

Address by Mr. Stupart.

During the past few years the ever-increasing number of enquiries regarding precipitation data have rendered it quite obvious to me that an accurate knowledge of the rain and snow of the country is of value to very many branches of the engineering profession, and those interested in the conservation of our natural resources.

In view of this I was very pleased indeed when I received an invitation through Mr. Campbell to be present at this meeting of the Canadian Pulp and Paper Association, especially as I was to be in Ottawa about this date.

The Meteorological Service has from its inception paid very considerable attention to Climatology, and an enormous mass of valuable statistics have been collected from the older and more thickly settled portions of the Provinces, where most of the work has been done by voluntary observers supplied with instruments by the Government. It has been largely from the records from such stations that the Meteorological Service has in the majority of instances been able to give when desired, fairly satisfactory climatological information, but there are many parts of the Dominion for which available data is very meagre; as a matter of fact, information very frequently sought nowadays, is regarding districts until quite recently, far in the wilds. The engineer is the pioneer who penetrates the northern wilderness to seek the head waters of streams to be utilized for power purposes.

In order to report with any degree of accuracy on the climate of a district, observations extending over at least ten years should be available, but in the Dominion to-day, of 532 stations reporting there are but 164 with a ten-year record; of these 91 are occupied by voluntary observers; in 46 instances the same man has taken the observations throughout the term, and a few of them have been reporting for a generation or more.

It is now recognized that in order to have continuous observations, it will be necessary to remunerate observers for their work, and within the past two years provision has been made by the Government for paying a small monthly salary to rainfall observers and the Meteorological Service is now in a position to establish stations at any point where it can be shown that precipitation data is required in connection with water power.

In order to emphasise the fact that changes in local conditions, such as those represented by clearing of the land, do not greatly affect the climatic conditions of a district, I am going to tell you something about rainfall in general.

Rainfall is a phenomenon connected with the general circulation of the atmosphere of the whole globe. The first essential for rain is that there be moisture, which must come through evaporation, either from water surfaces or moist land surfaces. The warmer the air, the more moisture it can hold in suspension as vapor:

At temperature 30 deg. it can hold 2.21 grs. per cubic foot.

At temperature 51 deg. the amount is 4.42 grs. per cubic foot.

At temperature 72 deg. the amount is 8.50 grs. per cubic foot.

Roughly speaking the possible amount is doubled for every increase of 21 deg. Fahrenheit.

Now, assuming that the air is saturated with moisture, what is going to bring it down as rain; the answer is, cooling, and the cooling process as provided by Nature is the outcome of expansion in ascending air currents.

What makes the air rise?—perhaps the simplest example we have is the air rising from lands heated by the sun in same way that air rises above a stove. You see the effect of such rising air in the heavy clouds which form on a hot summer's day and which at times produce thunderstorms.

But most of our rainfall results from another phenomenon which causes the upward movement of air and this phenomenon is the cyclonic area, this being an area within which the atmosphere is moving spirally inwards towards a centre, and also upward. The upward movement causes expansion, and hence cooling, and as soon as the temperature by falling reaches the dew point, the rain begins to fall.

The cyclonic area is the medium through which lands lying in the middle latitudes get their rainfall.

The general circulation of the atmosphere near the earth's surface in the Northern Hemisphere includes the Trade Winds from the N.E. in the tropics. North of these a belt of calms and north of this again a general drift from W.S.W. to E.N.E. and it is within this drift that the cyclonic area moves.

In regions of the earth where rainfalls are extremely heavy, it will almost invariably be found that such regions are near the sea on the weather side of Mountain Ranges and uplands which deflect the moist sea air upwards, and with the resulting cooling, rains heavy and persistent, will fall.

I want you to understand from what I have said that the forces at work in Nature to produce rain are simply enormous, and man who can never have any control over the motions of the earth in its orbit and on its axis, or over the output of Solar energy, will never be able to modify Meteorological conditions to anything beyond a very slight extent.

Seeing, then, that we must make the best use of what Nature gives, we must first determine exactly what it is Nature does provide climatically, and this can only be done by long terms of accurate observation.

We now know that in the past in this country, there have been periods of drought, and again periods of heavy rainfall, but so far we have been unable to determine with any degree of accuracy to what extent these periods recur in more or less regular cycles.

I. H. WELDON, President-Elect.

We feel assured that the character of seasons, as regards both rain and temperature depends largely on the path taken by storms in moving from West to East. In some seasons and at times for a number of seasons, the path is further N. or further S. than in others, and it appears altogether probable that these variations in the mean path of storms from year to year are all connected with changes in the energy received from the sun

I shall not attempt here to explain how this probably operates but I would say that in my address in May last as President of Section III of the Royal Society, I stated my views on the subject.

Some years ago I took up the question of Rainfall and lake levels, and quite recently I have brought the rainfall data right to date. Taking the region of the Great Lakes as a whole, I can show that the period from 1870 to 1880 was a period of excessive precipitation which was preceded by a lesser amount and has been succeeded by a precipitation which has been falling off in an irregular manner.

In certain districts of Ontario, and notably in Algoma, the past year has probably been the driest in a generation, and up to the end of August the total precipitation was less than 70 per cent. of the normal.

We may fairly surmise, then, that it will increase again, especially as we know that there was a long period of light precipitation in the thirties and early forties of the past century.

Our records show, then, that the operations of man in cutting down the forests have had no large effect on the climate, but there is just some suspicion that deforestation of the southern half of the continent has led to a somewhat warmer summer and a colder winter, and it may be that the rainfall has diminished a little. Be this as it may, with deforestation, the runoff of the rain water is more rapid, and hence the fluctuation in streams will be greater than formerly, and hence it behooves us to collect such information as will render it possible for the Engineer to construct at a minimum cost such works as will provide for a more uniform flow of the streams.

ADDRESS OF MR. W. P. GUNDY.

To the Members of the Canadian Pulp and Paper Association:—

Gentlemen:

That the average citizen has a very inadequate conception of paper-making and its problems must be evident to all who are engaged in the industry. Misconceptions prevail which are intensified by the lack of a proper classification of the various grades of paper in Census returns and Custom reports. I shall endeavour to make clear some distinctions absolutely essential if one is to intelligently consider the problems which must be met in developing an industry for which Canada has so many natural advantages. These distinctions or divisions naturally fall under three heads—pulp-making; the manufacture of news print, and the making of book and writing papers. Other divisions might be made but these three are outstanding. While submitting statistics regarding pulp and news print I wish to confine my argument largely to the making of book and writing papers in Canada.

The extent of the pulp interests of the Dominion may in a measure be understood by a consideration of the following figures in part gleamed from a report of the Forestry Branch of the Dominoin Government issued in 1913. This bulletin is based on reports received from 48 firms operating 64 mills in Canada in that year. These Canadian mills used 1,109,000 cords of pulpwood valued at the mill, at $7,243,000. United States mills imported, supplied by us, 1,035,000 cords of pulpwood, valued at $7,070,000. These two items combined amount to $14,313,000—Canada's production of pulpwood. If the wood exported to the United States had been made into groundwood pulp at $14.00 per ton, the $7,000,000 would have been $14,490 000. If made into sulphite at $38.00 per ton, it would have returned $19,665,000.00. In other words by reason of the export of our raw material $12,000,000 was lost to Canada and this vast sum which might have been spent in wages and supplies in this country, provided employment for thousands of workmen in the United States and helped to enrich our friends across the border.

The following comparisons between 1900 and 1910, the year of the last Census are not without interest, and show the rapid growth of the paper industry. Unfortunately they come under the one general head "Paper" and are therefore of no value in determining the development of widely differing classes of business, no distinction having been made between news print and other grades of paper in the Census bulletin. I venture to suggest that we endevour to have at least these two classes recognized in the next Census returns:

	1900	1910
Establishments	28	35
Capital	$7,507,819.	$23,104,516.
Salaries and Wages	1,191,038.	2,895,717.
Cost of Materials	2,170,770.	6,510,886.
Value of Products	4,380,776.	14,109,014.

The Census Department suggests 20 per cent addition to the 1910 figures as a fair estimate of the increase in the four years 1910 to 1914 applied over all industries.

In what follows I do not venture to speak for the makers of pulp or of news print which have the whole continent for a market as both pulp and print enter the United States free of duty but rather for the book and writing paper mills which are struggling against adverse conditions with their shipments largely confined to Canada alone.

The declaration of war last August which closed every stock exchange throughout the world, and disorganized the whole system of world commerce, affected very seriously and adversely the book and writing paper industry. Notwithstanding this fact, from time to time there have appeared in the public press very misleading statements to the effect that the "paper mills were rushed with business—were working full capacity—the demand being normal and prices a little better." Possibly this misapprehension has arisen from the trade returns which show that paper is exported from Canada in large quantities and it is only natural to conclude that an industry which can export 12 millions in a year cannot be in a very bad way, forgetting, it may be, that this includes news print for the free admission of which into the United States the powerful American Newspaper Association waged a long and finally successful war. The trade and commerce returns present some interesting figures which, I have said, are apt to be misleading unless comparisons are made. Under the heading of "Paper" our total exports during 1914 were $12,752,000, during 1910, $3,185,000—an increase of over $9,000,000 in four years. Almost the entire amount of these exports was made up of news print paper, $11,386,000, in 1914.

Let us now consider our importations of paper—a vital question to every Canadian manufacturer: Our importations in 1914 were $8,042,000 and in 1910 $4,658,000. Of the $8,000,000 about $800,000 was News print. A superficial examination of these Government returns would lead to the conclusion that Canada is a very large exporter of paper and therefore should be perfectly well equipped to care for the home markets on a profitable basis. I submit that such a conclusion is not borne out by the facts. We export over $11,000,000 of news print and a trifle over $1,000,000 of all other grades of paper.

We import $8,000,000 of paper and manufactures of paper of which only $815,000 is news print.

In other words, we export practically one grade of paper only, news print—we import all grades excepting news print.

What is the reason for this anomalous position? Is it because our book and writing mills are not properly equipped or that we lack the energy, capacity or capital necessary to supply our home market or to compete in foreign markets?

I believe that our mills are well equipped—that we have the energy, capacity and capital but we are handicapped in several directions.

It is undoubtedly the case that the better grades of paper form a considerable portion of the $8,000,000 importations. One of the reasons why these grades are not made more extensively here is that we lack raw material of the best quality which is necessary to enable us to profitably compete with the mills of England and the United States. High grades of foreign sulphite, indeed all grades, enter these countries free of duty; we pay a duty of 25 per cent (increased yesterday to 32½ per cent) and 25 per cent is prohibitive upon the higher grades. Contrast for a moment our position with that of the English paper maker; he has his raw material free; we pay a duty of 25 per cent. —now 32½ p.c.; he has the world for a market and can specialize and run his machines from year end to year end without change. He pays low wages; we pay high wages, man for man and girl for girl probably twice the wages of the English mills while, to add to our difficulties, the freight rate from Liverpool to Winnipeg is but a trifle more than from Toronto to Winnipeg, and the duty on the finished paper is 10 per cent less—now 12½ per cent less than we pay on our raw material—sulphite.

Across the border the U. S. paper maker secures his high grade sulphite free of duty and ships his finished paper into Canada at the same rate of duty that we pay on our sulphite.

We are operating, moreover, with heavy duties upon almost all our other raw materials and machinery. Our alum, our bleach, our glue, pulp, coal, dandy rolls, wires and dryer felts, all pay tribute to the Exchequer. Indeed we seem to be singled out for special though not kindly attention as I find only two items on the free list and these have disappeared; the majority of our requirements varying from 20 to 27½ per cent duty, and we are expected to thrive on a protection of 25 per cent. on our finished product—now increased by 5 per cent. on English supplies and 7½ per cent on the general and intermediate tariff. If Canadian mills are to compete, they first must be placed in a position to import the foreign sulphite of the higher grades such as Canadian pulp mills do not attempt to supply. The one strong argument from the point of view of the Government in favor of a duty on sulphite is that of revenue, and this is one of the strongest reasons why that duty should be reduced as the present tariff of 25 per cent or 32½ per cent is almost prohibitive and therefore returns but a small revenue to the Government. If that tariff were reduced materially upon the better grades of sulphite, importations would follow in such quantities as to return to the Government a larger revenue without in any way affecting the interests of the existing pulp mills in Canada.

For the reasons given, the book and writing mills find it difficult to hold the home market. How can we be expected to cultivate an export trade in competition with countries importing so much of their raw material free of duty upon which we are heavily taxed.

I believe, moreover, that the Government could assist us materially by adopting a different classification of the importations. At present we cannot determine with any degree of accuracy how these importations are divided as between the different grades; information essential to the Government if they are to properly determine cases of under-valuation as well as of great service to the paper mills.

Representations have been made from time to time to the Department and it is hoped that these may yet prevail, and better classifications be adopted, so that the character of the paper coming in may be revealed and under-valuation more readily checked.

There are other reasons, too, why the book and writing mills are today short of orders; merchants have not been preparing their annual catalogues as in former years, and these consume enormous quantities of paper. One reason given is that they have found it difficult to quote prices ahead; are timorous about pushing business in any new channels or pressing vigorously upon their old customers; the usual business announcements have not been forthcoming; new publications are not being printed; the brokerage business is at a standstill and no new flotations call for elaborate prospectuses so that orders are hard to procure and are few in number.

W. P. GUNDY.

Our market has been flooded with bond and other papers from the United States and irritation and amusement struggle for supremacy when we read eloquent pleas in support of the "Made in Canada" movement printed upon paper bearing the watermark of United States mills.

I believe we should carry on an active and continuous campaign among the printers of this country requesting them to carry in stock papers **made in Canada**—to recommend to their customers that they should use these grades only, we, the paper makers guaranteeing that qualities will be just as good and prices no higher, which we can undoubtedly do if the Government will assist by modifying the tariff on the higher grades of sulphite. We should, if possible, carry the propaganda beyond this narrower circle to the citizens of our country and thus, if possible, keep the work at home. We believe we merit aid from the Government and consideration from our citizens. We are trying to keep the wheels moving here, notwithstanding the handicaps under which we are working and the shortage of orders, it has been our ambition to keep our mills running even though short time be the rule; to keep our men employed and to maintain salaries and wages as usual, as we believe in this we are performing a patroitic duty of great value to the State.

J. H. A. ACER, Vice-President.

Promptly at the conclusion of the luncheon, shortly after three o'clock, the delegates took a special car to Hull, Quebec, to inspect the plant of the E. B. Eddy Company. There they were received with all kindness by the members of the firm, and were shown through the mill. The absence of Mr. Geo. H. Millen and Mr. J. F. Taylor, president and secretary of the company, was a cause of regret to all members of the Association. These two gentlemen unfortunately had business in Toronto, which could not be neglected.

Many were the kindly references to the late President of the company, Mr. W. H. Rowley, whose recent decease has caused universal sorrow to members of the Canadian industry.

The company was split up into three parties, who began at different points in the plant on their tour of inspection.

The Eddy mill is one of unusual interest to all papermakers. Under careful management since the year 1851, the company has built up a set of manufactures and a warehousing system which are unique in the industrial world. Everywhere throughout the plant are evidences of the care and foresight of the gentlemen who have wisely directed the fortunes of the organization. The company manufactures everything from fine tissues to heavy wrappers and also a series of household products from a wax vesta to a wash board. The company gets its water and its wood from the Ottawa River.

The plant consists of six principal parts; the power plant,* ground wood mill, 'A' mill in which are manufactured board, tissue, book, writing and manila; "B" Mill where news is turned out, and "C" mill, which is the source of the bag papers and bags, for which the firm is famous. The match factory and indurated fibreware plant turns out products which are "household words."

From the Ottawa River the logs are drawn to the slasher mill and transferred by means of a steel conveyor to the large storage pile which normally contains for the winter's work upwards of 7,000 cords of wood. In the summer, the wood from the slasher mill is conveyed direct to the barkers. A small conveyer made by the engineers of the mill is used in winter time for supplying the rossers from the storage. Three barkers, one automatic and two hand barkers, take care of the company's needs. The barked wood is dropped down to the troughs which lead to the grinders. These concrete troughs are admirably placed, and keep the grinder men continually supplied. The trough splits into five parts, which go down between the four lines of grinders connected as previously indicated with the motors. The company makes use of an automatic counter for getting at the quantity of wood used each day. The grinders, which are the New England type, are placed three on a line. Their daily produce is about six and a half tons each.

After passing through the screen equipment of sliver screen three centrifugal screens, five flat Baker & Shevlin screens, and one Waterous screen, the pulp is transferred to a very large concrete slush tank and from there is pumped to "A" mill and "B" mill, which are about one hundred yards away. The Eddy Company has had great success with the new sliver grinder, which was put in, and a considerable saving is effected by this piece of machinery. Three Moore & White Save-Alls are used to reduce the quantity of pulp going out in the tailings. On the balcony over the grinder room is situated the battery of eight Baker & Shevlin wet machines for the manufacture of the laps which are used in the other parts of the company's plant. The grinder room and its accompanying equipment is a model of airiness and comfort. By having it on the ground level, the inconvenience of a dark grinder room is entirely obviated.

"A" Mill is equipped with three one-thousand pound beaters for each of the board, tissue, book and wrapping machines. One lava roll is in operation. In the beater room is also a size making and bleach making plant. The machine room contains one 96-in. Black and Clawson four-cylinder board machine of thirty-eight dryers, equipped with a Farnham vacuum roll, one new 76-in. Harper tissue machine with sixteen dryers, one 98-in. Beloit fourdinier book machine of twenty-two dryers, and one 100 in. Fourdinier with twenty-

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*For description of power plant see page 136.

Mr. Campbell's address see page 137.

seven dryers for manilas. The finishing room contains two stacks of supercalenders made by the Norwood Engineering Company, one slitter and rewinder of the Kidder Press Company, two guillotine cutters of the Seybold Machine Company, seven Dillon cutters and one angle cutter of Rice, Barton & Fales.

The Tissue Room above "A" Mill, contains four winders and perforators, two "Onliwon" machines and a box-stitching machine, which makes the containers in which the bulk of the tissue product is shipped.

"B" Mill has five 1,500 lb. beaters on the ground floor, and two 1,500 lb. Jones beaters on the upper floor for furnishing the two news machines. These are: one 118-in. Pusey & Jones, with thirty-one dryers, and one 102-in. machine with thirty dryers. There is here also one Moore & White four-drum rewinder. From the news mill the transference of product to the warehouse and the shipping floor is quite easy.

"C" Mill, in which the bag papers and bags are turned out contains three Dillon Beaters, two E. D. Jones Washers and one Bagley & Sewall Harper Machine eighty-four inches and thirty-one dryers.

The sulphite supply for all mills comes from the company's own plant which is situated about a third of a mile down the river near the Interprovincial Bridge. One fast cook and four slow cook digesters turn out together about forty tons per diem. The product is brought in the form of wet laps by teams over to the paper mills.

After visiting the paper mills the visitors were treated to a trip through the [illegible] match factory. Here the machines manufacturing match boxes at a rate a good deal faster than one could count, the match machines with their hundreds of feet of drying belts bristling with matches, the marvellous mechanical and human skill shown in packing matches in their various containers, and the wonderful care taken in preventing fires all called forth the admiration of the visitors. The company favored its guests with souvenirs in the form of sturdy nickel match boxes and with some wax vestas, which are the joy of every smoker. The visitors then went to see the indurated fibreware plant, which from the pulp supplied from the grinder room manufactures pails, tubs, pots and other useful articles. The pulp is compressed in screen forms under great hydraulic pressure, the resulting form is dried, buffed, dipped in shellac and kiln dried. After this treatment the result is a product which does not absorb moisture, warp or crack.

Visit to the Booth Mill.

The special car was waiting for the delegates when they completed their round, shortly before five o'clock. They were then taken to the J. R. Booth mill, and were conducted through the plant by Messrs. [illegible] and others.

In order to make the visit as interesting as possible, the visitors started from the beginning of the wood into the groundwood plant to the finishing room of the paper mill, and were thus enabled to follow the wood from its raw state to the finished paper.

The first portion of the plant to occupy the attention of the visitors was a most modern ground wood mill which is run by electric power with the exception of the grinders, which are driven by water. In the grinder room of this plant, we find twelve of the usual [illegible] type grinders arranged in three lines of four grinders each, and each line driven by a Morgan Smith turbine of the highest standard, which yields a production of from seven to ten tons to the stone.

From the grinder the visitors went to the top floor, on which is a series of rotary screens, screening the stock pumped up from the grinder room and supplying the screened stock to the thirteen large wet machines situated on the floor below, which were all busily turning out a beautiful grade of ground wood for the news mill. In this pulp mill, there is now being installed a decker, chests and pumps, to pump the stock over to the news mill in the slush state the same as is done by the No. 1 groundwood mill which is not in operation now, owing to low water conditions.

The next portion of the plant to be visited, was the sulphite mill which, unfortunately, was also not in operation, due to the low water. However, a tour of this plant was made, entering at the wood room in which there is a large number of barkers and two chippers, as well as the chip screens. Next to this, is the digester room, in which are two large digesters 14 ft. x 60 ft. with a daily capacity of seventy-five tons. In this room is also the chip elevator which elevates the screened chips to the hopper at the top of the room and which are fed into the digesters in the usual manner. Adjoining this is the room in which the blow-pits are situated and of which there are two. The blow-pits are upright and cylindrical in shape, being built of six-inch Southern Pine. From these pits, after the necessary washing of the stock has taken place, the stock is pumped to the wet room to be turned into laps. Following the blow-pits, the acid plant, which is of the vacuum system, was next seen. In this plant is noticed the usual vacuum pump and the rotary sulphur burners as well as the huge sulphur and burnt lime storage rooms, and to the rear, outside this plant, can be seen the large tank holding thousands of gallons of the prepared acid ready for use. Going from here to the wet room, one finds ten large wet machines and screens of sufficient capacity to take care of the daily output of the digesters. From this room, there is a conveyor crossing the street overhead, which conveys to the news mill, all sulphite required there, and thus reduces the cost of handling the stock to a minimum. Following along this conveyor, on the way to the news mill, the delegates passed through a huge boiler plant.

G. H. MILLEN, Chairman of Miscellaneous Section

which supplies all portions of the plant with steam. In this plant there are a number of Dutch Ovens to take care of the bark, etc., the rest of the plant being equipped with Babcock & Wilcox boilers with automatic stokers. Passing on, the visitors entered the beater room of the news mill, in which they found eight 2,000 pounds beaters and three refining engines. The equipment of this room is driven by a water turbine situated in the No. 1 pulp mill on the opposite side of the street, the line shaft crossing the street in an underground tunnel into the beater room basement. From the beater room, the next step was to the machine room in which were found three Pusey and Jones machines, two of which trim 142 in. and the other 122 in., and all machines running at 580 feet per minute. From the machine room, one enters a finishing room of very large dimensions, in which the day's production is wrapped and all shipped out the same day. On the second storey of the finishing room are two sheet cutters, one of which is a single cutter, the other a duplex. These two cutters take care of any soft wound or defective rolls, and turn same into sheet news.

C. HOWARD SMITH,
Chairman of Book and Writing Sections.

Leaving the news mill, a trip was taken through the board mill, in which could be seen a 120 in. six-cylinder machine capable of very large production, and supplying this machine, was a beater room adjoining the machine room, with a beating capacity of four-two thousand pound, one-twelve hundred pound, and four six hundred pound beaters as well as three refining engines. This plant is operated entirely by electric power and so constructed as to give a high degree of efficiency.

Owing to the limited time at their disposal, the visitors were unable to visit many points of interest, but it was notable that a tour of the entire plant could be made without going outside the buildings, as the plant is connected both overhead and underground.

Evening Dinner.

At seven o'clock the delegates sat down to dinner in the Ladies' Cafe in the Chateau. Several new faces had appeared during the day, and these were seen around the festive board.

A cause of great regret to all those who were present was that President Carl Riordon was unable to occupy the chair, owing to an attack of grippe, which had come on him suddenly during the afternoon. In his absence Vice-President I. H. Weldon performed the duties of chairman and toastmaster.

After the dinner, which, while simple, was tastefully served, the chairman called upon the members to drink the time-honored toast to the King, which in view of present circumstances within the Empire was responded to with unusual fervor. The chairman then called upon the Hon. Dr. Roche, Minister of the Interior in the Dominion Government, who had most kindly consented to speak. Dr. Roche was received with great enthusiasm and spoke along the following lines:

"It gives me unusual pleasure to be here with you this evening, and to listen to the discussion of problems which to me would prove unusually interesting. It seems to be expected of every man in political life that he can upon any and all occasions stand upon his feet and discuss any and all subjects with clearness and insight. I confess that it would suit me much better to sit back listening to your discussions upon the subject of the paper industry and the problems connected with it. If I were to discuss my own profession of medicine it would not prove very interesting to you; if I were to talk upon political issues, it would be quite out of place, and if I were to endeavor to discuss the question of paper manufacture I should merely display my own ignorance. However, I have received a cue from your worthy chairman that I should speak upon the Forests Products Laboratories, with which I have had the honor to have had some connection and responsibility. It gives me particular pleasure to believe that in the development of Canadian resources the Forests Products Laboratories under the capable direction of Mr. R. H. Campbell, Director of Forestry, and our worthy friend Dr. Bates, will be of great service to the Dominion of Canada. I must take no credit for the idea which led to the establishment of this institution, as the idea came from elsewhere, but it has been a privilege which I cannot overestimate to have been instrumental in some small way in the introduction of legislation, and the other necessary arrangements which would lead to the organization of this institution in Canadian industrial life.

I saw the advantages which the proposal offered, and have given it my heartiest support during the time which I have held office.

At the outset, some little diffidence was felt by those who had the matter under consideration as to where these laboratories should be established. As you know, there are two large and worthy institutions in Canada, the University of Toronto and McGill University, each of which had a peculiar claim upon the establishment of the laboratories under their jurisdiction, and it was feared that on account of the natural rivalry between any two institutions of this kind there might be engendered feelings which might be prejudicial to the best relations between the two Universities. Consideration was given to the fact that there exists in the University of Toronto a Faculty of Forestry which has done much to advance the interests of the profession in Canada, but it was decided that as McGill University possessed strength testing machinery particularly adapted for timber testing, the establishment should be undertaken in Montreal. Special quarters were provided by the University authorities and access to the testing laboratories made quite free. I am glad to say that the decision to establish the laboratories at McGill has so far occasioned no unpleasant feelings whatever between the University of Toronto and McGill University. I think that this broad spirit shown by our institutions of learning is a matter for congratulation.

R. H. CAMPBELL, Dominion Director of Forestry.

The work which the Forests Products Laboratories are undertaking has enabled me to make such representations to my colleagues that there has been no difficulty in securing the support of the Government in the financial part, and I am sure that every member of the government considers the money well spent. I beg to assure members of this industry that so long as I hold office I shall do all in my power to advance the interests of the Pulp and Paper Industry through the Forestry Branch, and in a more direct way through the Forest Products Laboratories, and in any other way which lies in my power. I trust the policy which I have pursued will have the support of my successor in office, and that there may be thrown into the development of this institution a spirit of industrial progress which will advance the interests of all.

In this connection I should make mention of an evil which has beset the path of the Forestry Branch in times past, which I have made an effort to remove. I refer to the failure to include under the Civil Service Act all the members of the Outside Service, as well of the Inside Service. It has come to my notice that a very unfortunate condition exists in the personnel of the Forestry Branch under which political patronage was made the standard of selecting men for office and position, rather than through actual qualification. As you can readily understand full efficiency under such a system is entirely impossible. It gives me very great pleasure to state that in the new Civil Service Act the law is so formulated as to remedy the condition of which I speak. The leaders in the Canadian Houses of Parliament have agreed that this session shall be one devoted exclusively to the momentous issues which this unfortunate conflict which is ravaging Europe, and testing resources of the Empire has raised.

There is no chance this year for the new Civil Service Act with the alteration to be law, but next session the necessary legislation will be accomplished, so that Mr. Campbell can carry on the important work of the Forestry Branch unhampered by the evils of the patronage system.

Anyone who comes across our beautiful country through the sunny valleys of Nova Scotia, or across New Brunswick, Quebec and Northern Ontario, with their wonderful wealth of forest and mine; through the fertile fields of Southern Ontario, through that vast expanse of wheat producing country in the Western Prairies and over the Canadian Alps—the majestic Rockies—into the sunny valleys of British Columbia, to the waters of the Pacific, can fail to be impressed by the magnitude of our resources, and the important part which we of to-day should play in their wise development. You, gentlemen, are interested in the development of one of the greatest of these resources, and of the carrying out of an industry which is of vital importance to our country.

As I have said, gentlemen, I myself am not a papermaker, and have very little knowledge of the industry. I should be glad to spend the evening here with you listening to the discussion. I shall take my seat with renewed assurance that the Forestry Branch and the Forest Products Laboratories, as well as my own personal efforts, are at your disposal for the advancing of the industry which you have at heart."

Following these speeches, it was announced that there had been an unanimous choice of Mr. I. H. Weldon as President, and Mr. J. H. A. Acer as Vice-President.

HON. DR. ROCHE, Minister of the Interior.

Mr. T. J. Stevenson gave way to Mr. Carl Riordon as chairman of the Chemical Pulp Section, and Mr. Geo. McKee to Mr. A. G. Campion as chairman of the News Section. Mr. Howard Smith was elected to handle the interests of Book and Writing, and Mr. Mr. F. MacGlashan of the Board Section, Mr. Geo. H. Millen remaining chairman of the Miscellaneous Section.

On the report of Dr. John S. Bates, chairman of the Technical Section, the constitution was amended to include that body within the Association. About 10 o'clock the meeting adjourned.

TECHNICAL SECTION.

The technical men held their meeting in the Ball Room of the Chateau Laurier, in line with the following outline of proposed basis of organization, which had been drawn up and distributed previously:

Objects.

To stimulate interest in the science of pulp and paper making in Canada, to provide means for the interchange of ideas among its members, and to encourage original investigation.

Activities.

Among the things which the section might undertake are the holding of meetings at which papers on technical subjects could be read and discussed, the consideration of standard methods of testing and drawing up of standard specifications for raw materials and finished products, the publication once a year or oftener of papers, references and abstracts of technical literature, and the consideration of the question of technical education along pulp and paper lines.

JOHN S. BATES, Chairman of the Technical Section.

Membership and Election.

Anyone interested in the technology of pulp and paper making, including chemists, engineers, mill managers, mill superintendents and others.

Each candidate for membership shall be proposed and seconded by a member of the technical section, and shall be voted on by the council of the technical section, a majority of whose votes shall be necessary for election.

Dues.

The annual dues for members shall be one dollar.

Officers.

The officers shall be a Chairman and a Vice-Chairman, elected for one year by the members of the technical section, and a Secretary-Treasurer, who shall be the regular Secretary of the Canadian Pulp and Paper Association. The Chairman and Vice-Chairman, with three Councillors elected from the technical section shall constitute the Council of the technical section. The Chairman, Vice-Chairman and Secretary-Treasurer shall perform the usual duties of these offices. The Council as a whole shall pass on membership, attend to business between meetings and shall have general charge and control of the affairs of the technical section.

Meetings.

The technical section shall have its annual meeting at the time of the annual meeting of the Canadian Pulp and Paper Association. Additional meetings may be held as determined by the Council.

Registration showed the following delegates present: Messrs. W. A. Anderson, Kinleith Paper Co., St. Catharines, Ont.; John S. Bates, Forest Products Laboratories of Canada, Montreal; O. F. Bryant, Forest Products Laboratories of Canada, Montreal; James Beveridge, Manager Beveridge Paper Co., Montreal; J. B. Beveridge, Dryden Timber and Power Co., Dryden, Ont.; A. O. Bowness, E. B. Eddy Company, Ltd., Hull; Charles F. Buss, St. Lawrence Paper Mills Co., Ltd., Mille Roches, Ont.; Pat. Byrne, Riordon Pulp and Paper Co., Ltd., Merritton, Ont.; R. H. Campbell, Director of Forestry, Ottawa, Ont.; R. L. Campbell, Secretary, Canadian Pulp and Paper Association, Montreal; T. Linsey Crossley, Laboratory of Dr. J. T. Donald, Montreal; J. A. DeCew, President, Process Engineers, Limited, Montreal; Dan Daverin, Provincial Paper Mills Co., Ltd., Montrose Division; G. W. Dickson, Laurentide Co., Ltd., Grand Mere, Que.; J. J. Herb, Inter-Lake Tissue Mills, Limited, Merritton, Ont.; J. J. Harpell, President Industrial and Educational Press, Montreal; J. O. Jenssen, Riordon Pulp and Paper Co., Ltd., Hawkesbury, Ont.; A. G. McIntyre, Bathurst Lumber Co., Bathurst, N.B.; T. J. Stevenson, Riordon Pulp and Paper Co., Ltd., Montreal; H. S. Taylor, Spanish River Pulp and Paper Co., Sault Ste. Marie, Ont.; C. B. Thorne, Riordon Pulp and Paper Co., Hawkesbury; Sigmund Wang, Riordon Pulp and Paper Co., Hawkesbury.

In his introductory remarks, the Chairman pro tem, Dr. John S. Bates, explained his position in the chair by reason of having been appointed in January by the President of the Association, Mr. Carl Riordon, for the purpose of helping in the organization of a technical section. The proposed basis of organization which had been placed in the hands of the technical men in the industry was drawn up at rather short notice, and was meant to serve the purpose of bringing up various points for discussion at the present meeting. He extended a very cordial welcome to those who had come to the annual meeting of the Association in the interests of technical development in the pulp and paper industry. He complimented the gathering on the large representation at this first meeting of the technical men and thanked those who had so kindly prepared papers at such short notice.

The reading of papers followed. Mr. C. B. Thorne of the Riordon Pulp and Paper Company gave an illustrated talk on his Acid Reclaiming System, which was listened to with much interest. The section was fortunate in hearing a heart-to-heart talk from Dr. J. W. Robertson, Chairman of the Royal Commission on Industrial Training and Technical Education, on the pressing need for technical education in Canada.

At the close of the address, the Chairman thanked Dr. Robertson for giving the Section a portion of his valuable time. He also took the opportunity of explaining the Forest Products Laboratories of Canada regarding technical training along pulp and paper lines. The Laboratories, by reason of being under the jurisdiction of the Federal Government, cannot directly take part in technical education along the lines of forest products. However, the location of the Laboratories at McGill University gives an opportunity for the science students of McGill to see the experimental work which is being done in pulp and paper and in other lines. Members of the staff also give a series of lectures each winter to the students in applied science at the University and occasionally public lectures at other universities and elsewhere. A certain number of students in applied science from the Canadian universities and particularly from McGill University will also have an opportunity of doing work in the Laboratories as temporary or permanent members of the staff before or after grauation. These men, after a training of this kind in the experimental paper mill, should be well fitted to take technical positions in the paper mills. The Laboratories will also depend on recruiting men for experimental work from the mills, so that the practical needs of the industry will be kept in prominence. As far as the activities of the Technical Section are concerned provision has been made for the appointment of a standing committee on technical education. No doubt it will be possible to do work of great value to the men in the pulp and paper industry by the establishment of correspondence courses, providing for a travelling instructor, arranging for short courses in the science of papermaking, and any other activities which may be in the power of the Technical Section of the Association.

The third paper was read by Mr. G. W. Dickson, of the Laurentide Company, Limited, on the subject of Grindstones in the manufacture of ground wood pulp. This paper was illustrated with several prints, and was listened to with much interest. Mr. J. A. DeCew, President of Process Engineers, Limited, next read a short paper on "The Value of the Forest Products Laboratories of Canada to the Canadian Paper Trade." The Chairman then called on Mr. R. H. Campbell, Director of Forestry, to say a few words on the work of the Laboratories which are under his jurisdiction. Mr. Campbell explained the support which the Government was giving to scientific work in pulp and paper making by the equipment of a more complete experimental paper mill in Montreal, and the appointment of a technical staff to carry on investigations for the benefit of the paper industry. He asked for the support of the technical men in the mills and their assistance in bringing to the attention of the laboratory staff the important problems with which they were confronted.

Owing to lack of time, it was found necessary to dispense with the reading of the three remaining papers which had been prepared by Mr. Bryant, Mr. Daverin and Mr. Robertson.

After a short intermission, the meeting proceeded with the business of organization. The Chairman pointed out the tentative nature of the outline of organization which had been suggested and asked the delegates present to consider the matter carefully, so that the technical men could be organized on a basis which would be best suited to present conditions and of greatest value to those concerned. Although there were theoretical advantages in bringing together the technical men in a separate and strictly professional technical association it was suggested that a start be made by forming a Technical Section within the Canadian Pulp and Paper Association for reasons of simplicity and for the co-operation which would be thereby secured. Following a general discussion by the delegates present, a resolution was proposed by Mr. J. J. Harpell, and seconded by Mr. Daverin, as follows:—

"In the opinion of those present, it is advisable that a Technical Section be organized within the Canadian Pulp & Paper Association for the purpose of promoting the scientific interests of the Pulp and Paper industry."—Carried unanimously.

It is moved by Mr. J. Beveridge, seconded by Mr. Anderson that—"The business of the organizing, as far as the officers are concerned, be as outlined in the memorandum read, thus—Chairman, Vice-Chairman and three Councillors—these five men to form a general governing body to be known as the Council, and that the Secretary of the Association act as Secretary of the Technical Section."—Carried unanimously.

Dr. J. W. Robertson, Who Addressed Technical Section

Officers were then elected as follows:—Chairman, Dr. J. S. Bates, Vice-Chairman, T. Linsey Crossley; Councillors, Mr. C. B. Thorne, Mr. Dan Daverin and Mr. G. W. Dickson.

It was then moved by Mr. Thorne, and seconded by Mr. Anderson—"That the remaining details of the organization of the Technical Section of the Canadian Pulp and Paper Association be left to the Council just elected, and that the Council be empowered to decide on the qualification for membership, fees and other necessary details of organization."—Carried unanimously.

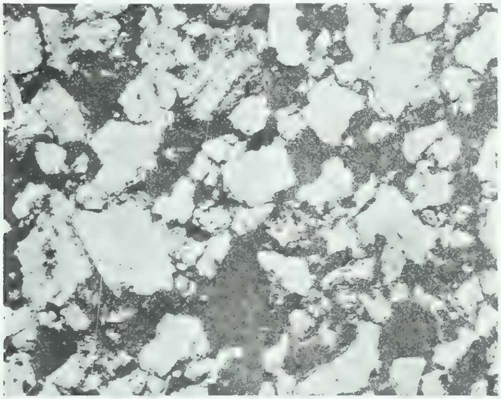
It was moved by Mr. Harpell, and seconded by Mr. Thorne—"That the drafting of the committees, and the appointment of members on those committees be left to the Council."—Carried unanimously.

It was moved by Mr. Crossley, seconded by Mr. Bryant, "That the meeting here adjourn to meet again jointly with the main section of the Canadian Pulp and Paper Association at 7.30 in the evening."—Carried unanimously.

PULP STONES

By G. W. DICKSON,
Laurentide Company, Grand Mere

Your Secretary-Treasurer, Mr. Campbell suggested to me the preparation of a paper on "Ground Wood." After considering and outlining such an article, it occured to me that the subject could be treated only in a most superficial manner considering the limited time left for its preparation, and also the time at the disposal of this Meeting for its reading. Consequently I have taken the liberty of narrowing the subject down to one part, perhaps the most important part, and one that has never been reduced to set rules or mathematical formulae, I refer to the Grindstone.

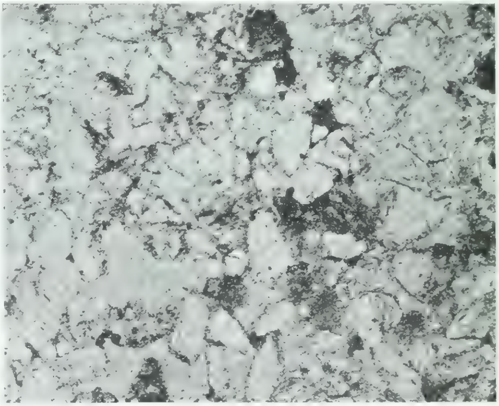


English Sandstone.

In this article I wish to discuss a few of the problems that have, no doubt, presented themselves to every user of pulp stones. I am not a Geologist, consequently will not burden my remarks with scientific terms, but, they will, for that reason, I trust, be the more readily understood. When we speak of a pulp stone most of us naturally picture in our minds an English sandstone, so universally has that stone been used in the past for this purpose. There are quite a number of natural stones now in use, or being experimented with. For instance—the miramichi stone of New Brunswick. This is a dark colored stone of good mechanical strength, but appears to lack grit. These two characteristics are quite logically found together, if we consider the strength due to an excess of cementing material, which naturally, has no grinding power in itself. The cutting particles, being in the minority, as it were, are unable to grind as much pulp as in a stone in which they predominate. Going to the other extreme—all cutting particles and little cementing material—we find a good example in the Pirna stone, found in great quantity in the sandstone quarries near Dresden, in Saxony. This stone has an almost marble-like whiteness. A mounted section of this stone (slide) shows the quartz particles closely packed, with merely a film of cementing material surrounding them. Although not familiar with this stone in operation, it would appear as one that would give a good production, but would require frequent burring and consequently would not be durable. Dressing this stone under a bush-hammer, it pulverizes readily, and its action under the sharpening burr would probably be similar. This stone is largely used in the Voith magazine grinder, and its performance will be observed with considerable interest in this country.

Having mentioned the two extremes of stones—the Miramichi lacking grit, and the Pirna having an excess of it, we will refer to that "happy medium," the English sandstone. Apparently its structure is better balanced for pulp making than any other natural stone now in use. It has sufficient grit to give good production combined with sufficient cementing material to make it durable. A mounted section shows a much larger proportion of dark cementing material than was to be seen in the Pirna stone.

The artificial stone must not be overlooked. It has many advantages, but the process of its manufacture is still far from perfect. For large stones, grinding 3ft. and 4ft. wood, and having 60 inches or more diameter, it has decided advantages. By reinforcement, it can be made safer for high speeds than the natural stone, which is difficult to obtain perfect in large blocks. Again, in the artificial stone, the Grit can be absolutely controlled, the cutting particles being passed through a screen of specified mesh, say 20 or 30 meshes per inch. One stone, made from emery particles, has been largely used. Its cost is nearly double that of an English sandstone, but its life and production are also double that of a natural stone, so that cost per ton are the same. The stock generally appears to be "sharp"—perhaps this is due to the fact that the emery particles are sharper than the quartz particles of the natural stone, and cut the fibres, rather than grind them.



Pirna Stone.

Delivered before the Technical Section of the Canadian Pulp and Paper Association.

The pulp stone after leaving the quarry is roughly hewed to shape, after which it is mounted on a machine, similar to a horizontal boring mill, and it is turned up like any other piece of work. The cutting tools are interesting. For outside cuts a tool similar to a paper machine slitter is used which has a slicing action on the stone, i.e.,it is set at an acute angle to the surface it is cutting, and being free to revolve, feeds into its own cut. Another method is to hold a tool similar to a crowbar on a rest, against the revolving stone, in the same manner that a wood-turner holds a tool on the hand rest. The cutting is performed as a series of vibrations, as when a piece of brass "chatters" under a lathe tool. To bore out the centre, a revolving tube is generally used, under which are placed steel balls, which are kept running in water. This is somewhat similar to the prospector's diamond drill, except that instead of diamonds set in the end of the cutting tube, the balls revolve under it and crush the stone.

The stone being finished and ready for the pulp mill the purchaser next appears in order of importance and it is his duty to inspect the stones and determine if they are suitable to his requirements. And right here comes the question that does not appear to be handled by any two firms alike. Every man inspects according to his own ideas; there is no standard specification. Whether such a standard will be realized is a question, but we should aim at something in that direction. The purchaser has, at present, such points as the following for consideration:

1—Grit by far the most vital quality of the stone, and yet one not very thoroughly understood. On first thought, grit would appear to refer to the size of the cutting particles. Just as important are the hardness and sharpness of these cutting particles. For example, the crushed emery particle of an artificial stone is doubtless sharper than the quartz particle of a natural stone that has been subjected to abrasion and friction with its fellow-particles in past ages, before it was pressed into a solid rock by the weight of sedimentary deposits superimposed upon it. It may, at that remote time, have been subjected to the action of water, until the particles became almost spherical, like pebbles, washed up on the beach. We also know that emery is harder than these sandstone particles. Consequently it would be of the greatest importance could we consider these factors as well as the size of the cutting particles.

Another point is uniformity of size of these particles —this is more easily determined. One method for example, is that a certain percentage of the samples, when ground up upon themselves, shall pass through a 30-mesh sieve and all shall pass through a 24-mesh sieve.

2—Natural defects of the stone consist of seams, cavities, sand pockets and foreign substances. Take a pocket-knife with a dull point and press against the stone with an equal pressure at different points. By locating soft spots and at the same time watching for discolorations, you will probably find seams and sand pockets. As most stones, when inspected, have just come from the turning machine, they are covered with fine dust from the cutting tool. A pressure hose or a wire brush will remove this. In addition to natural defects, you may, in this way, expose some artificial work in the way of cemented patches. These are not particularly objectionable unless on the face or cutting surface of the stone. Some foreign substances are injurious, such as flinty nodules, which, being harder than the rest of the stone, stand out and cut the stock off in short, coarse stubs, producing what might be termed "choppy" stock. Mineral discolorations generally follow seams and are undesirable. A seam in any position except parallel to the plan of rotation

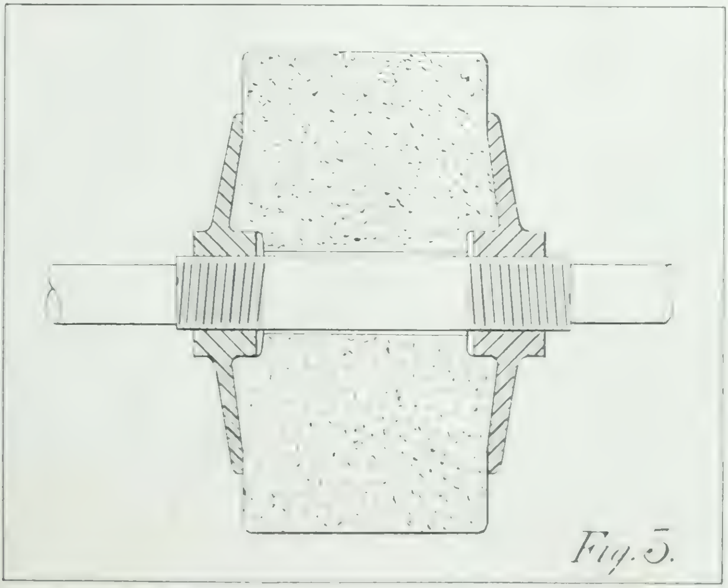


Fig. 5.

Grindstone, mounted, showing flanges and shaft.

is dangerous and the stone is liable to fracture along it at the first sudden increase of speed.

Knock samples off, preferably at the centre bore, mark them and retain them until the stone is worn out. Then you can keep a history of the stone's performance, quality or product, etc. A few samples of stones that have given entire satisfaction are very useful to keep as standards, to compare with stones you are purchasing. Study the structure of your standard samples under a reading lens, or low-power microscope. The general appearance of the quartz particles, the bonding material, etc., will become familiar and you will soon recognise them in stones you are inspecting.

We will now consider the pulp stone in operation in the mill. In regard to "hanging" or mounting on the shaft little need be said; it is merely a mechanical process, worked out by each mill as found most convenient to itself, one point, however, should not be lost sight of—the possibility of a stone "flying out" or bursting from excessive speed. This seldom happens a sound stone. If you examine what is left of a burst stone you will be pretty sure to find a seam or flaw, which, perhaps, was not visible on the surface of the stone. A peripheral velocity of from 3500 feet per minute to 4000 feet per minute is sufficient for all ordinary purposes. When that is exceeded trouble is liable to follow. Most grinders, except those having alternating current motor drives are liable to large speed variations and these sudden accelerations are generally responsible for accidents. A good form of stone and flange is one in which the stone is wider at the bore than it is at the circumference of the flange, and the flanges are correspondingly cupped to receive it. (Fig. 3).

In order to produce pulp it is next necessary to "burr" the stone, that is cut a series of small grooves in it. These may be cut in a great variety of ways, but they all accomplish the same purpose, viz.: to provide passages for the ground stock to pass off the stone. It is not these grooves, but the inherent grit of the stone that makes the stock. This is why grit has already been referred to as the most vital feature. There are, however, other means by which we may control the stock, though only slightly as compared to the influence exerted by the grit. We can control speed, pressure and temperature. Prof. Thickens, in a very interesting paper on the results of his experiments at the government experimental mill at Wausau, Wis., describes the influence of speed and pressure on the yield of pulp, strength of paper, etc. His conclusions as to speed and pressure are as follows:

1—Speed and Pressure affect quantity rather than quality.

2—Yield of pulp per cord of wood is greater at high pressures.

3—Yield is slightly higher at higher speeds.

Temperature affects the "hardness" or "softness" of the pulp. For ordinary news stock I have observed an average grinder pit temperature of 145 deg. Fahrenheit. A very soft stock, which has a curly appearance on the lantern slide is produced at about 165 degrees Fahrenheit. Burring the stone generally has the effect of freeing the stock, that is, the stone being sharper, the stock is ground off cleaner, there being little fine, flour-stock to hold water, the water flows off freely, or, as is usually termed, the stock is "free." Similarly a slow or comparatively dull stock is largely composed of flour - stock, which retains the water. In considering variations in the stock we must not lose sight of the fact that the stock is, perhaps, more susceptible to variations in the wood used than to the conditions referred to in the stones.

There is another grindstone trouble, generally developed after stone has been in use, viz., "scaling." This may be due to a natural defect below the surface, but more probably to small fractures produced by sudden heating and cooling. Heating the stone suddenly would cause rapid surface expansion, tending to loosen the heated surface layer from the body of the stone. The sharpening burr would soon find this week spot and break it down. The resulting cavity on the surface of the stone would tear off coarse slivers, and would also be noticeable as a knock in the grinder at each revolution. Sudden cooling would cause similar trouble, in that the surface would contract more rapidly than the body of the stone and form shrinkage cracks. The only remedy is to turn down below the scale, and be more careful next time in starting up or shutting down.

I have always felt a doubt in my own mind in regard to these increased yields with increased speed or pressure. It might be advisable to modify this "yield" to "apparent yield." For it is not reasonable to suppose that by grinding up wood under different conditions we are going to get a larger quantity in one way than in another. "Matter cannot be created or destroyed." It may disappear in one form but it will reappear in another. Consequently, perhaps, a closer check on re-water or screen tailings might explain these apparent differences in yield.

What appears to me as another proof of this is the fact that we see no general tendency in mills to increase speed and pressure up to a certain point, where they could get the greatest number of pounds of dry pulp per cord of wood. Speed and pressure vary so much in different mills that one is led to believe that there is no relation between them and yield. If there were a certain speed and pressure at which a maximum yield could be obtained we would find all mills striving to attain it. Of course we can increase speed or pressure, or both and obtain a higher production, but "production" must not be confused with "yield."

As the paper manufacturer is already looking to other sources of supply than the spruce tree for his pulp, so should we be considering a time when it may become necessary to replace the natural sandstone with something better and cheaper. The makers of artificial stones may solve the problem, and I consider the chances rather in their favor. But to make a new stone we must thoroughly understand the present ones which nature has made for us, as far as possible, learn her formula to solve the problem.

The illustrations which are herewith produced were used by Mr. Dickson in his address in Ottawa being handed to the members on proof sheets.

The address of Mr. Thorne is not reprinted in this issue, but it is expected on March 15th along with reproductions of the large wall charts which he used to illustrate his remarks. The addresses of Messrs. Daverin, Bryant and Gelertsen were not read. Only the addresses of the latter two gentlemen are reproduced here. Mr. Daverin's will appear in the next issue.

Dr. Robertson's address was ommitted from the difficial stenographer's report, and was not available at the time of going to press. It will appear on March 15th.

MR. CAMPBELL'S ADDRESS.

Throughout Dr. Roche's address was listened to with keenest attention and his reference to the placing of the Forestry Branch on a Civil Service basis and his own expressions of willingness to co-operate with the Pulp and Paper Association were loudly applauded.

The Chairman then called upon Mr. R. H. Campbell, Dominion Director of Forestry, who said, "Gentlemen, the Honorable Dr. Roche, who has just addressed you has pointed out the possibilities of the Forest Products Laboratories. From the first I have felt assured that these Laboratories would do much in rounding out the work of the Forestry Branch. I have also felt assured because of the action of the Laboratories at McGill University. Not only is much of the valuable equipment of McGill placed at the disposal of the Laboratory staff but the co-operation with the members of the Engineering and Chemical staff of McGill is providing a very favorable atmosphere for the Laboratories and a proper stimulus to the men engaged in experimental work. As you know special stress in the way of equipment is being laid on pulp and paper apparatus. A considerable sum has been set aside for the equipping of an experimental paper mill with all the necessary machinery for carrying on paper making processes. It has been a matter of satisfaction to me and to other members of the Government to see the hearty support which has been given to the Laboratories by the Pulp and Paper Association. So much depends upon the co-operation of the practical men in the industry that I trust you will make all possible use of the Laboratories and lend assistance in the working out of problems that are most important to the paper industry in Canada.

"As we look into various continental countries of the world we are struck with the fact that forest conservation has been one which has been given great and serious thought. Germany, whatever may be our attitude toward that country at the present time, must be given credit for having made wonderful progress along the lines of growing crops of wood. It is true that Germany was forced to conserve her forests earlier than most countries on account of internal economic pressure. Germany stands today far in advance of Canada in scientific forestry methods and we are just now learning the vital importance of applying scientific methods of forest conservation in this country. The forestry problems in Canada are of course quite different from those in a compact and highly organized country such as Germany where the forest area is relatively small and the planting of trees is practical. The Forestry Branches of our Dominion and Provincial Governments are devoting their whole-hearted attention to the conservation of the forests coming under the jurisdiction by the development of fire fighting organizations, by the proper disposal of brush and by the taking of proper measures for the preservation of the existing forests and making provision for natural protection. In addition to this we must learn to use the products of the forests in such a way as to make them of the greatest possible value to consumers. I feel that there is much that can be done by studying the adaptability of inferior woods for the manufacture of valuable products and in the perfecting of processes in the pulp and paper and other wood using industries. The Forestry Branch I can assure you will do all in its power to promote the best interests of forest conservation and I trust that through the Laboratories we can be of real assistance in the study of improved methods of utilizing the raw material which the forest places at our disposal. The spirit shown by the pulp and paper men at this annual meeting is very gratifying to us."

Dr. J. S. Bates, Superintendent of the Forest Products Laboratories of Canada and Chairman of the Technical Section of the Association was then called upon to report on the morning meeting of the Technical Section. Dr. Bates said that he hoped that the succession of three speeches from Government officials would not make the speech-making appear to be a "Government monopoly." On the basis of the outline of organization of the Technical Section which is printed elsewhere he went on to describe the aims, objects and general methods which the Technical Section had adopted in the morning session. "Although the question of organizing a Technical Section had only been brought up a month or so ago, and although the proposed basis of organization was sent out to the technical men throughout the industry only last week, I feel that we have met with unusual success in bringing together those interested in the technology of pulp and papermaking. In fact I think that we had as many members attending the Technical Section this morning as were present at the meetings of the main Association. We had a registration of no less than twenty-one and a number of others were present for the last part of our meeting. The first part of the morning session was given over to the reading of papers on technical subjects. When plans for this meeting were made we expected out of eight or ten requests for papers to find that two or three of the more faithful would undertake to present papers at this short notice. However, we had miscalculated and no less than seven papers were offered, in fact so many that we only had

WM. F. MacGLASHAN, Chairman Board Section, Canadian Pulp and Paper Association.

time to hear the first four addresses. Mr. Thorne, Mr. Dickson and Mr. DeCew gave talks on pulp and paper questions, and Dr. J. W. Robertson, Chairman of the Royal Commission on Industrial Training and Technical Education gave us a most inspiring talk on the value of technical education, which I wish all members of the Association could have heard. During the business meeting which followed the reading of papers, the foundations of organization were laid and officers were elected. The many details were left to the Executive Council. There was considerable discussion as to whether or not the best results would be obtained by the organization of the technical men as a section within the organization. It was finally decided that it would be well to organize in this way and a motion was passed to that effect. The technical men are of course interested primarily in the science of paper making while the business men in the general association are interested more largely in financial matters, production and so forth. Although the constitutions and activities of the two bodies are quite different and their relation really a nominal one, I feel that it is a relation of mutual goodwill—goodwill of the Technical Section to the general Association and goodwill of the general Association to the Technical Section.'' Dr. Bates then went on to read the resolutions, which were passed at the morning session and to give the names of those who had been elected as officers. This information will be found elsewhere in this issue.

At the close of the three above addresses Mr. W. P. Gundy rose and proposed a hearty vote of thanks to the Honorable Dr. Roche, Minister of the Interior and the other speakers for their courtesy in attending the meetings of the Association and in signifying their interest and support of the work which the Association was doing. He went on to point out the importance of the pulp and paper industry in Canada, its rapid growth during the past few years and the natural adaptability of papermaking to Canadian forestry and water power conditions. He took the opportunity to advocate again the use of paper made in Canada, particularly by the Government and associations such as the Pulp and Paper Association, as well as by the public in general. He gave an amusing instance of one worthy Canadian organization which had spread broadcast circular letters to encourage the use of goods ''Made in Canada.'' On holding up to the light the letter which he himself had received, he found staring him in the face a well known foreign watermark. He did not lose the opportunity of chiding the officials of this organization for their failure to live up to the principle which they were advocating. Mr. Gundy went on to show what valuable assistance the Government was lending to the pulp and paper industry, and to other Canadian industries, and was glad that there was this opportunity of assuring the representatives of the Government that their efforts were very much appreciated, and that the Pulp and Paper Association would do all in its power to promote the best interests of the industry in Canada.

The E. B. Eddy Power Plant.

The Hydro-Electrical Plant of the company which was installed a couple of years ago, is remarkably efficient. The power house is of reinforced concrete construction and is very substantial and of attractive appearance. The forebay has been completely decked in with reinforced concrete arched work of sufficient strength to carry future factory construction. There are three units; the water wheels are of the horizontal open flume type, each unit having four runners operated at the normal head of forty-two feet at 164 r.p.m. Each turbine is rated at 4,500 horse-power. The turbines are controlled by exceptionally large governors. One exciter turbine has also been installed. The switch boards are placed on a gallery built over the bus chamber, step-down transformers and the electrically operated oil switches. The plant affords a fine example of the increased efficiency and flexibility of large water wheel direct-connected to generators transmitting power electrically to motors direct-connected to their load, over the old method of driving each group of machines by a separate small water-wheel of doubtful efficiency with its usual supplement of belts, countershafts, etc.

The company, realizing that their old pulp mill, in which each pair of grinders was driven by an individual water wheel, was very inefficient in the use of water, decided to discard it and erect in its place a modern hydro-electric plant. By so doing they could secure a better head of water and use units of high efficiency and transmit the power electrically to a new pulp mill, in which the grinders were direct-connected to motors, also of high efficiency. The wisdom of this course has been quite evident by the increased output of the grinders and the saving in water used on the water wheels. Three 4,500 h.p. units installed in the power house have replaced thirty-one water wheels, which were used in the old pulp mill and nine stones are now producing more pulp than 18 stones did when installed in the old mill, due to the increased power and better speed regulation.

This new mill is of structural steel and concrete, approximately 180 feet long by 130 feet wide. The mill is practically divided into three long rooms each 180 ft. long by 40 ft. wide, the motor room being partitioned off from the mill, in order to keep out the moisture which is always present in a pulp mill.

The mill is designed for five main grinding units, each unit consisting of one 1,200 h.p. type ''HF'' 2,200 volt, 233 r.p.m. induction motor located in the motor room, with the shaft extended through the wall into the grinder room, where it is direct-connected to three 3-pocket New England grinders with stones 26 in. x 54 in. At present there are four such units installed, except that on one grinder a 34 in. stone is used to grind any wood that is too long for the 26 in. stones. This switchboard is located directly opposite the motor it controls, which makes a very simple and compact layout. An ammeter is also placed in the grinder room on each unit, so that the operators of the grinders may see the load they are putting on the motors.

Provision is also made for two refiners; consisting of four stones on one shaft direct-connected to one 200 h.p. type ''HF'' 2,200 volt, 290 r.p.m. induction motor. The motor is placed in the motor-room with the refiner connected to an extension of the shaft in the grinder room. At the present time one such set is installed. In the motor room there is also placed three 300 kw. 2,400-440 volt transformers and switchboard to control same for supplying the smaller motors around the mill.

VALUE OF THE FOREST PRODUCTS LABORATORIES OF CANADA TO THE CANADIAN PAPER TRADE.

Paper of J. A. DeCew, Montreal.

The Canadian paper manufacturer is today in the splendid position of having a Governmental institution, maintained for the express purpose of investigating all those problems which have special relation to the manufacture of paper and the development of wood products in general.

Owing to Canada's geographical location, our wood products are more or less distinctive in their character and uses, so that concentration upon problems, that are the results of our present conditions, should develop a series of conclusions more applicable to Canadian manufacture than those put forward by any foreign Bureau.

The value of an institution such as this, however, in the manufacture of wood products, will depend, to a large extent, upon the co-operation and suggestions of the manufacturer. There is an important field of usefulness for this institution, which cannot be filled by any commercially technical establishment and much valuable work, which is either impossible or impracticable in industrial plants, can also be done. Every manufacturer is faced with difficult problems which may be solved or overcome in various ways in the mill, but regarding which no conclusions are established or published. It should be the endeavor of the paper making end of the Governmental Institution to elucidate those general principles regarding our products under present conditions in Canada, which would establish a theoretical basis for consideration or discussion. Instead of exerting their energies in the search for substitutes for spruce, they will doubtless endeavor to show why this wood has such advantages in paper making that substitutes find a very uncertain hold in the trade and why its market value today is higher than that of other pulp woods.

It will also be of great service to the manufacturer, if, in working on the problems which the latter does not have time to solve himself, they are able to record scientific data which is particularly valuable in the mechanical and chemical field; and wherever possible, to point out some of the fallacies or unsound theories which have a temporary vogue.

It is possible that an institution, such as is now being established, may eventually be used in an industrial way, as a means of obtaining criticisms on the newer processes and methods that are offered to the trade, and in this way save some of the cost of general experimentation. The existence of a disinterested service, is an opportunity which will be welcomed by everyone interested in the technical and commercial advances of wood industries. The development yet to be expected in paper and wood products is very great and the opportunities for our new institution are unlimited.

It is without doubt the intention of our Government to aid in every way the development of our wood working industries so that our raw material may be brought to the highest perfection of manufacture before leaving the country, and consequently they will be looking to this Bureau for practical suggestions which will accelerate such developments. The publication and general diffusion of knowledge regarding the actual advancement of the wood working arts will certainly do much in this direction. The Director of Forestry should be congratulated upon the rapid advances already made and the excellent staff secured for the work. The writer feels confident that the only further conditions really essential to its general usefulness will be the personal and widespread interest of those engaged in the manufacture of paper or other wood products.

SULPHITE PULP LOSSES.

Paper of O. F. Bryant.

The manufacture of pulp and paper in Canada has had a wonderful growth in the past few years and owing to the natural resources of the country is sure to become of increasing importance in the future. During the year 1913, there were used in the manufacture of chemical and mechanical pulp 1,109,034 cords of wood. Of this amount 54.1 per cent. was consumed in the production of groundwood, 33.1 in the production of sulphite pulp, 12.3 in the manufacture of sulphate pulp and 0.5 per cent. in the preparation of soda pulp. Of all the wood used in the manufacture of chemical pulp 367,105 cords or 72.2 per cent. was treated by the sulphite process. The reasons for the greater development of this process are many, among which might be mentioned the peculiar adaptability of the sulphite fibre for the manufacture of various papers and the high yield of pulp obtained by this process.

The manufacture of sulphite pulp really began in in 1874 and for this reason it must be classed with the younger chemical industries, its rapid growth has probably been due to the increased demand for news and wrapping papers. Like most young industries, particularly those of a chemical nature, it has the fault of entailing an enormous waste of valuable material. From the time the tree is cut until it leaves the mill as finished pulp there is one long series of losses and to say that less than 25 per cent. of the standing tree comes out of the mill as pulp is giving a very conservative estimate. These losses occur as follows: about one-third of the original tree appears at the mill in the form of logs; 15 p.c. to 25 p.c. of the log is lost in preparing the wood for the digesters and at least 50 p.c. of the weight of the wood charged to the digesters is lost in the waste liquor. There are also losses of fibre in the white water and tailings which further augment this waste.

In order to give some idea of the magnitude of these losses the following data have been compiled. It has been previously stated that during the year 1913 the sulphite process consumed 367,105 cords of wood. Assuming roughly that two cords of wood yield one ton of sulphite pulp it is found that there were approximately 183,500 tons of sulphite pulp manufactured in 1913. Now for every ton of pulp produced there is at least a ton of waste, so that the amount of waste in 1913 was 183,500 tons. In addition to this, for every ton of pulp produced an average of at least 250 lbs. of sulphur and 200 lbs. of lime were lost. This amounts to a total of 22,900 tons of sulphur and 18,350 tons of lime, which represents a total value of three quarters of a million dollars for loss of chemicals alone. It is practically impossible to estimate the value of the sulphite lignin compounds, etc., in the waste liquor.

In the acid plant itself there are numerous losses. If the combustion of the sulphur is not carefully regulated, there is a considerable formation of SO_3 in the burner gas, which not only brings about a loss of sulphur but causes trouble through the formation of insoluble sulphates in the cooking acid. A gas containing a very appreciable amount of oxygen causes oxidation of the sulphite compounds in the cooking acid thus causing an additional loss of sulphur through the formation of insoluable sulphates.

In the cooking operation large losses occur. Probably 10 per cent of the cellulose present in the wood is attacked and broken down into soluable decomposition products through the action of the acid at the high temperature employed and much of the fibre which is not destroyed is greatly weakened.

These are some of the losses which occur in the manufacture of sulphite pulp and it is naturally of interest to know what has been and can be done to eliminate this waste. Most of the improvements which have been made to date have been along mechanical lines such as, improved acid and recovery systems, improved wood preparing machinery and more efficient screens, wet machines and save-alls. Each mill has its own ideas concerning strength of acid, time of cooking and temperature and it must be admitted that while these differ greatly in individual mills the product is of a remarkably uniform nature. However much remains to be done in determining the best temperatures, acid strengths, etc., to be used for the production of various grades of pulp, i. e., "strong" pulp and "easy bleaching" pulp. The proper procedure for cooking different woods should be given careful attention. Everyone is familiar with the problems which are encountered by mills using hemlock wood in trying to compete with mills using spruce but no one knows just why it is that the hemlock fibre is inferior, in many ways to the spruce fibre. It is within the range of possibility that methods for cooking hemlock could be found such that the fibre, if not equal to that of spruce, would at least be greatly improved.

In the wood-room the losses are all of a mechanical nature and the largest losses are those of barking and chipping. In barking with the ordinary disc barker there is an average loss of at least 20 per cent. Of this loss from 9 per cent to 10 per cent is due to the bark and the remaining 10 per cent consists of good wood which would produce pulp. In the chipping operation a loss occurs due to the formation of sawdust and fine chips which have to be screened out. The barking losses in a great many mills is far in excess of what it should be and can be reduced by proper attention to the barking operation. Drum barkers eliminate the wood waste to a great extent and are finding considerable favor in the industry. The sawdust loss in the chipping operation is unavoidable but can be reduced to at least 3 per cent by proper regulation. Since the barker waste is sent to the boilers and burned for the production of steam it is often contended that it cannot be considered as waste. But three pounds of hog fuel are equivalent to only one pound of coal, and in view of the present cost of wood, this is at best a very inefficient form of utilization.

Sulphur losses in the acid plant are comparatively small but close control should be kept over the acid making in view of the fact that any sulphates which may be formed are a detriment to the whole process. Sulphates cause trouble in settling out as sludge in the system and, it is claimed by many authorities, are liable to cause the fibres to become brittle. In any case, they are of no benefit to the process and should be eliminated if only for the reason that they cause a loss of sulphur. If the necessary amount of air is admitted to the burner, the gas kept sufficiently strong and the temperature of combustion maintained at the proper point only a small amount of sulphates will be formed. At a temperature of 900 deg. C. SO_3 is dissociated into SO_2 and O so that if a temperature approaching this is maintained in the combustion chamber very little SO_3 is formed. At this high temperature it is comparatively easy to carry a strong gas and thus the sulphur loss due to oxidation is reduced.

Fibre losses are for the most part, well taken care of in up to date sulphite mills. Practically all the fibres are reclaimed by passing the white water through save-alls and in most mills the tailings are refined and worked up into a coarse grade of pulp. The fibre losses in this direction generally amount to less than 2 per cent.

The waste liquor of the sulphite mill has always been a source of trouble and speculation. The amount of organic matter poured into the rivers annually is enormous and it may be only a matter of time when legislative action will be taken against this pollution. On the other hand, it is well known that the waste liquor contains many valuable constituents which it is desirable to recover. On account of the very dilute conditions of the liquor, of which there are about 2500 gallons per ton of pulp produced, it is difficult to devise any economical method for reclaiming these substances. A large amount of work has been done on this subject and many ideas have been advanced and patents taken out for processes either using the liquor directly or recovering its constituents. To give an account of all the investigations which have been made and the processes which have been brought out would occupy a great deal more time than we have at our disposal and it will suffice to mention a few attempts which have been made to utilize this waste.

At various times it has been proposed to utilize waste liquor or its constituents for tanning material, for the production of alcohol, as a fuel, road binder, core binder, glue, size, cattle food, briquetting material and for the production of valuable products by dry distillation. Nearly all the proposed schemes fail from a financial point of view for the reason that it is necessary to expend two dollars to save one. The proposals to utilize the organic matter contained in the waste liquor as a source of fuel were, until recently, unsuccessful in that the fuel value of the dry matter was less than the coal required to evaporate the liquor. Destructive distillation was abandoned for much the same reason—the products obtained would not pay for the coal, labor, etc., expended. The recovery of the tanning substances from the waste liquor has promised more or less success but much remains to be done before the use of sulphite tanning material is on a satisfactory basis.

The following is a brief description of the process devised by A. Kumpfmiller for the production of tanning materials from waste liquor. The liquor is heated to boiling and violently agitated to drive off as much sulphurous acid as possible, after which sodium carbonate is added to form sodium sulphite, and this is next converted into sodium chloride by the addition of hydrochloric acid. Lactic acid is added to form calcium lactate which compound is not injurious to the leather. The liquor is then evaporated to the proper concentration. By mixing this tanning extract with other tanning materials very good results are claimed to be obtained.

One of the most interesting and important processes brought out is that of Ekstrom for the production of alcohol from waste liquor. This process consists in cooling the liquor, aerating, neutralizing with lime sludge from sulphate mills, filtering and fermenting. After fermentation, which is completed in about 72 hours, the liquid is filtered and distilled in the usual manner. The alcohol obtained by this process contains appreciable amounts of methyl alcohol, acetone, furfural and acetaldehyde and so is unfit for drinking purposes, but can be used for technical purposes in a like manner to denatured alcohol. The fact that alcohol could be obtained from waste liquor by neutralizing with lime and fermenting was known for a long time and the really new feature of Ekstrom's process is the use of waste lime sludge for neutralizing the liquor. A yield of from 13 to 15 gallons of alcohol per ton of sulphite pulp is claimed for this process. Of the 9 to 10 per cent of dry substance in waste liquor fermentable sugars are present only to the extent of from 1 to 1.5 per cent, so that this process does not begin to utilize the total constituents of the liquor. Recently a process for utilizing the organic matter in the liquor as fuel has been brought out by Strehlenert. While it is too early to predict the success of this process, it can be said that experiments on a fairly large scale promise much for its future. As was stated before the main difficulty that has been encountered heretofore in attempting to utilize the fuel content of the liquor, has been that the fuel is not as great as the coal required to evaporate liquor to the proper point of dryness. In the Strehlenert process the liquor is not evaporated but the organic matter is precipitated out. Briefly the process is somewhat as follows:

To the hot liquor a small amount of sodium bisulphate is added whereby calcium sulphate is precipitated. The precipitate is allowed to settle and the liquor is drawn off into digesters for further treatment. It is then raised to a temperature of 100 deg. C., and air pumped in until a pressure of about 275 pounds is reached. At this point the free SO_2 in the liquor is oxidized to sulphuric acid. The liquor is further heated to a temperature of about 160 deg. C. Between 160 deg. and 170 deg. C. decomposition of the calcium ligno sulphonate takes place. The temparature is now raised to about 200 deg. C., at which point the operation is completed. As soon as the calcium ligno sulphonate begins to decompose, the pressure in the digester rises rapidly, due to the liberation of SO_2, and it is necessary to begin relieving the gas. The SO_2 gas is carried directly to the acid system and utilized for the preparation of cooking acid. During the last part of the heating process a small current of air is passed through the liquor in order to obtain the [illegible] in a granular rather than a gelatinous form. Experiments on a semi-commercial scale showed an average recovery of [illegible] lbs. of organic material having a calorific value of [illegible] B.T.U., [illegible] lbs. of sulphur and from [illegible] lbs. of calcium sulphate per ton of pulp produced.

Much remains to be done on the question of sulphite liquor utilization; in fact a start only has been made in this interesting field. In spite of the large amount of attention that has been devoted [illegible] we are still ignorant as to the exact nature of the material with which we have to deal and until we gain some knowledge in this direction we shall be working in the dark and can expect no rapid progress. It therefore seems desirable that our efforts be concentrated upon discovering the chemical nature of the substance or substances contained in the liquor.

In considering the whole subject of losses in the sulphite process we must consider that under the present economic conditions a certain amount of waste is absolutely unavoidable, but in every case it is for our interests to reduce this waste to the lowest possible point. As an incentive to this end it is well to bear in mind the statement of a famous chemist to the effect that the sudden rise of one of the great commercial nations was due to the discovery of means of utilizing its waste products.

SULPHATE INDUSTRY IN CANADA

Paper of Einar Gelertsen.

Wayagamack Pulp & Paper Co., Ltd., Three Rivers, Q.

The forests are among the most important natural resources of Canada. There are vast areas of land suitable for agriculture and there are immense mineral supplies that will play an important part in the economic life of Canada, but the larger part of the Dominion can scarcely be used for anything but the growing of trees. Therefore, the future prosperity of Canada is largely dependent on the development of her forest resources.

In the early days the sawmill industry was practically the only one doing anything in this line. Later on came the groundwood and sulphite pulp industries which utilize some of what the sawmills leave as unsuitable for saw lumber. Thus an increased yield from the forests is attained but these industries are limited to a few kinds of wood and for technical reasons are very particular about the quality of the wood used for pulp. Therefore, their principle merits, as far as forest economy is concerned, is in the value they have created for "pulpwood." There is still altogether too much wood left in the forests when the sawmill, groundwood and sulphite operators have made their cuttings and there is a danger that logging carried on along these lines will greatly retard a natural renewal of trees and depreciate the quality of the woods.

Fears in this respect have created a strong public opinion for conservation of the forests. There are two lines for such a policy—the one practically demands a tree planted for every tree cut, without considering the economic conditions for doing so. Theoretically this may be right but it is doubtful whether the forest products industries in Canada are, at the present time, remunerative enough to stand a higher cost of raw material that would follow such a policy. At any rate there would be many drawbacks to such a method and it is to be hoped that such a measure will never be required for the protection of Canadian forests.

The other line is more constructive. It endeavours to develop the utilization of forest products to such a degree as to make forestry a paying proposition and thus induce the forest owners to do reforestation work in their own interests or at least make them able to carry the burden of a rational conservation law.

The sulphate process for pulpmaking is of great importance in this respect. It is able to convert practically any kind of wood into commercially valuable pulp and consequently utilize, with economic success, wood that otherwise is useless. This gives quite a new value to the forests. Everything in the wood content of the tree, except roots, branches, etc. will be worth taking care of, which means not only higher yield from the forests but also cleaner cuttings, which is one of the most important features in efficient forestry. The increase in value given the sawmill timber by turning the sawmill refuse into pulp instead of burning it will also encourage [illegible]

The abundant supply of pulpwood suitable for sulphate pulp offers great inducement to build up this industry on a large scale in Canada and therefore the question of market for this pulp is an important one. At the present time most of the sulphate pulp is used as "kraft" that is, raw material for a dark colored strong wrapping paper. This has gained ground in the market to a very considerable extent and there are reasons to believe that this market will be enlarged. The board mills are beginning to realize the advantage of the strong sulphate pulp. It is also used for quite a number of paper specialties. By proper cooking and bleaching the production of sulphate pulp fitted for book, writing and other high-grade papers is practicable. Abroad this industry has developed considerably and with the cheap electric power that is available in this country there are great possibilities for developments in this line.

The range of market for sulphate pulp is largely dependent on the production cost of the pulp. It is true that by using low grade wood the sulphate industry can keep the wood cost low, but this is still the largest item, just as in the other forest products industry. In this way from the stump to the digester the pulpwood is subjected to a variety of manipulations that add to its ultimate cost and influence its fitness for pulpmaking. Often a great deal can be gained in this respect by spending some extra money on the logging and storage of the pulpwood. If the Canadian Pulp and Paper Association is going to tackle the great problems of pulp and paper making there is no doubt that the treatment of pulpwood is well worth a thorough investigation. This will require a close co-operation between the lumbermen and some section of the Association.

Many of the troubles with which the sulphate industry had to fight at the beginning have been overcome by dearly bought experience, but there still remain many problems to be solved before this industry reaches the same degree of perfection that is characteristic of the modern ground wood and sulphite mills. In this connection there is plenty that might be done by the Technical Section. There is also much that cannot be tackled by the individual mills, although important to their welfare. We therefore welcome the organization of the Government Forest Products Laboratories. Although the sulphate industry is the youngest and smallest of the pulp industries in Canada it is hoped that, by reason of its undeniable importance in efficient forestry, the sulphate industry will enjoy the co-operation of the Technical Section and the assistance of the Laboratories.

THIRTY-EIGHTH ANNUAL MEETING OF THE AMERICAN PAPER AND PULP ASSOCIATION

Enthusiastic Convention of over 700 Paper Makers in New York City on February 17th and 18th.

In point of numbers outclassing every Convention heretofore held and in enthusiasm and good fellowship shown, one of the best ever known, and in actual work accomplished one of the most satisfactory to the Executive, the Thirty-eighth Annual Meeting of the American Pulp and Paper Association on February 17th and 18th was a decided success.

The meeting was characterized by President Frank L. Moore, who has again accepted the weighty responsibility of guilding the Association through its activities, as a meeting which will mark a new epoch in the history of the Association.

The seven hundred manufacturers of the United States and Canada who attended the Association were as one in the conviction that the presidency of Mr. Moore in the past year has been the means of gathering the strength of the Association and of showing great promise for the activities for the future. Mr. Moore's re-election to the office of President will make it possible to carry on continuously the good work which he has so ably initiated.

From early on Tuesday the 16th inst., the halls of the beautiful and historic Waldorf Astoria were thronged with those attending the Convention and by Thursday night, the time of the annual Banquet, the hotel was practically alive with paper makers. Over seven hundred and twenty sat down to dinner in the large banquet hall and enjoyed to the full and addresses of distinguished speakers.

Tuesday was taken up with the various divisional and committee meetings which were for the most part devoted to organizing permanently. The Test Board Division completed its plan of organization. About forty per cent of the tonnage of this grade of paper was represented at the meeting and elected the following executive committee: Sidney Frohman, of Hinde and Dauch Paper Company, chairman; Charles W. Bell, of the American Strawboard Company, and M. W. Waldorf, president of the Waldorf Boxboard Company. The division adopted a code of trade customs. The question of electing a secretary was left to some future date.

At the meeting of the Wrapping Paper Division of Tuesday the report of the secretary was read to about thirty or forty company representatives. The secretary recommended the organization of an office of the division in Chicago. The budget for the ensuing year was added to materially. The following were elected to the executive committee: L. M. Alexander, of Nekoosa-Edwards, chairman; George W. Bayless, of the Bayless Manufacturing Company, and George E. Crafts, of the Orono Pulp and Paper Company.

Frank L. Stevens presided at the meeting of the Tissue Paper Division and read the annual report of the division which was approved. The action taken by the division in November was confirmed whereby the association became a part of the parent organization. Frank L. Stevens, of Stevens & Thompson Paper Company, was re-elected president of the Tissue Association and W. R. Hobbie, president of the Phoenix Paper Company, was re-elected treasurer. The matter of selecting a secretary and all other business was left to the discretion of an executive committee comprising: A. D. Coffin, of C. H. Dexter & Sons; John A.

Brannan, of the North End Paper Company; William E. McIntyre, of McIntyre Brothers and Rodebush, together with the officers.

The writing and cover paper divisions met and conducted routine business and the executive council was re-elected to serve another year.

Completing the organization of the division and the conduct of routine business were the main features of the meeting of the Newsprint Division which met on Wednesday and adjourned until Thursday. There will be some changes in the personnel of the executive committee for the ensuing year, but these are not yet ready for announcement.

Report of the Board Division.

At the Board Division meeting Frank S. Harrison presided, and read the following report:—

During the early part of the past year the Board Division enjoyed fairly good conditions. Since May the demand has fallen off badly, with a consequent loss of anything like a fair profit. The Sherman Law case against the Eastern manufacturers has been settled. Anyone who is interested to understand how little justice and how much stupidity is embodied in this law and its administration, can get a very good idea from reading the editorial in the "Paper Trade Journal" for February 11th.

It is certainly time that not only the businessmen of this country wake up to the danger of this law to them, but that the ordinary citizen understand just where it is leading him. If it is desirable that businessmen engage in a struggle to the death, each in his own line of work, then the present law is suitable to meet the condition. For my own part, I believe that is a medieval condition already shown to be undesirable.

It takes no wizard to see, however, that the present law, carried out as it is now, will result in the survival of the financially strongest, with the result that the survivor will thereafter have a complete monopoly, the very thing the law is intended to prevent. In certain lines of trade this is already the result. Respectfully submitted.

(Signed) FRANK S. HARRISON,
Vice-President Board Division.

The members of the executive council remain as before and are as follows: F. S. Harrison, of Halltown Paper Board Company, chairman; Sidney Mitchell, president of United Paperboard Company, and C. E. Williams, treasurer of the Piermont Paper Company.

The meeting of the general association began on Thursday morning, with the reading of President Moore's address, which is as follows:—

Report of the President.

Gentlemen: We are assembled in convention for our thirty-eighth annual meeting. In accordance with an established custom, I am called upon to make a report as your president.

Historians, when they are called upon to chronicle the events of the year 1914, will not only have to record the horrors of war but also the upheaval and unrest of business conditions throughout the world. These conditions always exist when world powers are battling with each other, but they were doubly aggravated in this country during the past year because coupled with the war was hostile tariff legislation. Either one is enough to tax the resources of the captains of industry as they have never before been taxed.

Our industry is no exception to this rule. You captains of this industry have been called upon to face labor troubles; to face increased costs in manufacturing, a part of which has been compulsory on account of the action of legislators, and to face a diminishing consumption. Many of you, receiving more or less of your raw material from the countries that are at war, found the shipment of these supplies stopped, or if shipped their costs were largely increased. You have undoubtedly been called upon to contribute more for charitable purposes this year than ever before. All of which tends to diminish profits.

How to overcome these conditions is the problem which you and I want to see solved. There are all kinds of theories advanced as to what is best to do to improve conditions. Many of them are advanced by men who simply want to curry public favor—to be popular with their fellow men, and have not any semblance whatever of being practical. Within a few days we have heard a man, who is at the head of one of the great corporations of this country, say that the wealth of an individual when he dies should be heavily taxed for distribution among the poor. Others who have been great corporation attorneys are advocating socialistic ideas that they may curry favor with the unemployed. To distribute the income which might be derived from sources of this kind would require an immense working force, and the closest scrutiny would have to be exercised to prevent much of this income from being diverted into wrong channels.

The tariff has been the football of politics; in other words it is the paramount issue that is brought into every national campaign. After years of prosperity under a protective tariff the people become uneasy in seeing the cost of living gradually rising higher and higher, and believing that a change to a free trade policy would bring them greater prosperity, more money with which to meet the daily demands of living, the change is made under our ideas of popular government. What is the result? Business is timid, is slow to adapt itself to the changed conditions, curtailments are the order of the day, and this is the beginning of the recruiting of the army of the unemployed.

All of these things are very well for him to advocate who makes his living by preying upon the public mind with new schemes and new ideas but, gentlemen, it is all wrong. You and I, business men, are not giving the time to public affairs that we should give. If we would take one-quarter the interest in whom we elect to be our legislators, to make laws under which we must conduct our business, as we do to the management of our own business, many of these new fads and ideas would never be heard of; the Socialist party would not be increasing year after year, as is the case to-day. In my opinion we should advocate a non-partisan tariff commission and remove the question of tariff entirely from politics. We should then start a campaign of education throughout the country, demanding that our national government turn its attention towards fostering and protecting the manufacturing industries of this country rather than persecuting them in dissolution suits and in many other ways.

It seems to be the popular trend of public thought that everyone engaged in trade and commerce is a trust unto himself, that he is doing something in some way, possibly in connection with his neighbor or his neighbor's neighbor, that is compelling the people —the consumer, who have to buy what these other people are producing to pay a little higher price than they think they should do, and so there must be an investigation started, a suit brought, fines paid, all of which we must put on the debit side of the cost of living, and still prices remain the same.

Our government thould adopt a policy similar to the German government, which fosters, protects, and looks after the manufacturing industries. They are organized into societies known as the "Cartels." They have a "cartel" of iron manufacturers, of the paper manufacturers, and of other lines of manufacturing. The government sanctions these "cartels," and allows them to apportion territory, to fix prices, to limit output, and do any and all things that will enable them to earn a return upon their investment. This attitude of the government is what has given Germany the intense population she has to-day.

The people want and demand publicity, and I believe in giving them everything that they should have. We cannot blame them for being distrustful when fanatics have falsely told of the watered stock and enormous profits of all kinds of business in this country. If they would spend half as much time in an honest investigation of the conditions actually prevailing throughout this country they would find that he who is responsible for the successful operation of the business in which he may be engaged is working harder than anyone in his employ that he may not only break even, but be able to pay the daily wage to his employees without any reduction.

The attitude of the government should be to foster and protect any person or corporation or combination of any kind that employ labor; that they may earn their daily wages and thereby live without depending upon the increase derived from the taxing of the estate of some individual who dies and leaves a large fortune. It is for the government to apply the principles of industry and employment if we would have a happy and contented people. A country was never prosperous when its army of unemployed depended upon alms given for support, and I am surprised that some of the great captains of industry are advocating alms giving as a means of support for the unemployed instead of demanding, as should be done, that our industries be so protected that the unemployed may be employed.

The time has arrived when an association such as the American Paper and Pulp Association should, if necessary, take the initiative in starting a movement to change the trend of public thought, which, to my mind, is fast drifting away from the essential principles that go to make a rich and prosperous country. You perhaps may differ with me as to the time having arrived when we should take the initiative, if necessary, in advocating that which we believe will tend to improve general conditions, and in improving general conditions, our conditions will be improved. I speak of this fearlessly, as it is the only way in which some other associations with which I am connected have made themselves felt as a power for good, and which are looked to to-day to suggest policies for the carrying on of such work as they are interested in. Those who a few years ago were opposed to every suggestion that emanated from these organizations today are working hand in hand to accomplish something in a practical way that will be permanent for the generations to come.

If the history of this association is ever written the past year will be its reconstruction period. All associations arrive at this time sooner or later. In order that its reconstruction may be builded upon broad and liberal policies, it calls for the best judgment of the best of you, and when you give it much can be accomplished by association work. You come to know each other better; you come to believe in each other; you rub elbows and find our neighbour is not as dishonest as many have tried to make you believe. You find that he wants to believe you are as honest as he thinks he is himself; in other words the distrust which you have of your competitor is wiped away, and you realize that he has no particular advantages in manufacturing over what you have. You get to a point where you discuss various improvements in machinery, various economies that may be suggested, various phases of mill conditions, and when you are through you are surprised that you have lived the years that you have wholly within yourself, and that you have not allowed yourself to benefit any by the experience of your own competitors. When you get down to this point and ask yourself—am I going to be honest with my competitor, come out and meet him frankly in the way in which I believe he will meet me? Then you will find that association work will be of benefit to you. All of this can be done without infringing upon any law, and I am surprised, after going as deeply as I have into the work of this association to find the many things that can be done that are entirely lawful.

I believe there was a grave mistake made by those who framed the Federal Trade Commission Bill, in that it does not provide a way for us to go before that commission and lay before it just exactly what we intend to do, and ask for its opinion as to whether or not it is legal. I believe this commission or some other commission should be empowered with the authority to decide questions of this kind and from whose decision there can be no appeal. This is another one of the things in which this association might well take the initiative.

A year ago it was felt by many that its policy was entirely wrong. It was agreed that we must maintain the American Paper and Pulp Association as the parent body; that the expenses of the parent organization must be reduced to a minimum; that the divisions must arrange for their own expenses, with an additional amount for their pro-rata share of the expense of the parent organizations; that the only salaried office of the parent organization should be a secretary; that the divisions should be organized with a secretary for each division, and to be entirely under an executive committee from that division. I make this criticism and any others without the intention of casting any reflection of any kind upon those who you have previously selected to manage the association. It was simply history repeating itself—the time had come for a change, and you demanded it. I wish to say that I enjoy the closest personal relations with your former officers that it is possible for one to have, and my criticisms are not of the individual, but of the modus operandi, and the modus operandi is of your own choosing.

The wrapping division was the only one that organized in this way at that time, and procured a secretary. The wisdom of this action has been borne out many times during the past year unless there is much more criticism than I have heard or been able to find, and I have been looking for it all the time.

Some three or four months after the annual meeting I was elected your president. The only contest that developed for this office seemed to be as to who would not take it, and I being in the minority protesting against the honor drew the unsought place. It is a position of honor and confidence, and the greatest tribute you can bestow upon any one of yourselves, but when I tell you that collections had not been made and salaries only partially paid, and this was made possible only by one company advancing money in an attempt to keep the organization together until your executive council could meet and put it upon a business basis, you can see why the allurements of office were not attractive, and particularly when it had been decreed that the position was purely an honorary one. However, I accepted the responsibility, knowing I had the confidence of your executive committee. Without this confidence I doubt if I would have had the courage to undertake the work. The office immediately resolved itself from an honorary position to one of eighteen hours a day. I am not going to weary you by citing the thousand and one things that came to me for a final decision, but only say that the first work was to make collections and provide means for financial support, and to economize wherever it could be done.

Then came the problem of organizing those groups of manufacturers making the same kind of paper and divisions. This may appear to you to be an easy task, but I know it to be hard, slow and discouraging work. Without a general secretary I have been obliged to use Mr. Bishop, secretary of the wrapping paper division, as such, and by doing it was criticized by many of the wrapping paper manufacturers.

The writing paper and cover paper divisions organized by themselves, and did not cause us any special concern, but were able to lend us valuable assistance by suggestions.

The wrapping paper division was also organized in the same way.

We have succeeded in organizing or partially organizing the following divisions, all of which are sub-divisions of the American Paper and Pulp Association:

The tissue paper division; news division; test board division; chemical pulp division, and now there are others who wish to come together that they may become better acquainted.

I have not accomplished all that I had hoped to do by this time, but I believe if you had been as closely in the work as I, you would be partially satisfied with the results. It means at least another year of hard work, and you must be patient if you want to see results.

Those of you who have had the work in charge have carried it on along lines that seemed to them to meet conditions. When the war broke out, I started a system of weekly letters, with which you are familiar. Other forms of letters were suggested by Mr. Bishop and sent out over my signature. I have asked by circular letters if what we were sending out was of interest and should be continued, and for suggestions as to what we could do to be of more assistance to you. Everyone approved of the weekly letter, but with one or two exceptions we failed to receive any suggestions for doing anything different. If you felt like criticising and did not, I am going to criticise you for keeping quiet. There is nothing that will make an organization more efficient than good, honest, wholesome criticism. No one man or small number of men can suggest methods unless he be super-human that will satisfy you all. I know most of you, and you occupy positions of honor and trust in the social and civic life of the communities in which you live. You do not hesitate there to express yourselves as to what you think is right, yet when you come to your own business in connection with this association, which is the only avenue open to you to obtain information pertaining to this industry, you shirk the opportunity offered you.

I am speaking now of those who are not members of either this association or any other, and also of some here who fail to appreciate the opportunities for legitimate information that is offered them.

During the last few months I have, as far as I have been able to, studied the conditions that prevail in other lines of manufacturing, jobbing and wholesaling, particularly as to whether or not men engaged in the same kinds of business have associations and places where they can meet and discuss such matters as pertain to their own particular business. I find that almost without exception there is hardly a line of manufacturing, of wholesaling, of jobbing, that has not an organization of some kind, and I defy you to show me one industry that has not an organization that is paying its stockholders a dividend. On the other hand, I have been started at the results that many organizations are attaining without violating in any way any law, but they are not accomplishing results by being suspicious of each other. They are doing it by coming out freely with criticisms and suggestions, believing each other is honest, speaking frankly and not afraid, as many of you are, to stand up and demand the rights which are yours.

I wish I had it within me to express myself more forcibly than I am able to do of the value of an organization, providing each will do his part. If you are not willing to do this, and your stockholders are willing to accept meagre dividends, if any are paid at all, then you may keep on the same as you have in the past; in other words, it is up to each of you individually as to whether or not you wish to help yourself.

We may find here and there a mill that is paying such dividends as are satisfactory to its stockholders. If we should analyze the conditions that make this possible we might find that, instead of charging it up at the market value, they are charging their wood up at the cost it stands them on their books when it was purchased years ago at low prices. He who does this is simply fooling himself as he is immediately losing the profit which he is entitled to upon his raw material. You may say that this does not make any difference—it is simply transferring from one pocket to another, but I say to you the one who starts to earn a profit by charging his own mill with the raw material which goes into the manufacture of his product at less than current market prices is cheating his stockholders out of a profit to which they are entitled. They should be entitled to the enhancement in value of the raw material, and then insist that he whom they elect to manage their properties should so manage them that he could add to the market price of raw material the cost of operating and then show a profit.

I am speaking thus plainly hoping to convey to you the idea that I have in my mind, which is this—that if such a man would become active in association work, meet with all of the others engaged in manufacturing his particular kind of paper, he would soon see the wisdom of charging his operating account with the raw material at market prices, manufacture it and sell it at a price which would yield him a profit on top of that. This is just what is being done in many organizations, and this advantage is one that belongs and accrues to the keen judgment and foresight with which many of you gentlemen here are possessed.

This is no new theory except possibly the way in which I have applied it to association work. It is simply common sense put to a practical test. If you are ready to meet it, then this association will be an honor and a credit to the paper manufacturing industry of the world.

I have had said to me, for instance, that the manufacturer of writing paper was so far removed from the manufacturer of newspaper that there was nothing in common between the two. I have selected writing and news simply for an illustration. I differ with those who hold this view. I have made the statement many times that the value of all papers depend upon the value of the cheaper papers, and for this reason: If the manufacturers of the cheaper grades of paper, such as wrapping and news, for example, are satisfied with the profits they are making they will not change their machines onto other grades. You all know where news machines have been put onto semi-book or on light weight catalogue paper, and other grades entirely different than what was intended when the mills were built. You have known of other machines going onto still higher grades of book paper, of bond paper, or on what the fine writing paper manufacturers might call a cheap writing paper. Why have they done it? Because they have not been satisfied with the profits which they were earning on what might be termed their legitimate grades of paper that they are entitled to make, so they think they can "beat the devil around the bush" by making a somewhat higher grade, not knowing the difficulties which they would encounter, but believing that they can manufacture and sell this somewhat higher grade at a lower price than the mills that are already making this grade can afford to manufacture and sell it for. We start with the cheaper papers in the demoralization of prices, and it goes right up through to the finest grades of paper that are made.

Therefore I say that the fine writing paper manufacturer is and should be just as much interested in seeing the wrapping manufacturer or news manufacturer have a stable market as he should be in seeing that his own market is satisfactory. All branches of the paper industry are so closely interwoven that when we get down to the fundamental basis we are all together, one either directly or indirectly dependent upon the other.

I have said that we were going through a reconstruction period, and it is true.

There have been many improvements made in machinery, and many new devices invented, many of which have been adopted by you, all of which goes to show that many of you are attempting to apply economics here and there that you may overcome diminishing dividends by adding new devices to your equipment. If you were not all the time studying these things you would not be the captains of industry that you are, but would you not be still greater if you would go one step further and give the benefit of your thoughts and judgment to association work? This is an age of associations, and in giving more time and thought to work of this kind you will simply be doing what nearly all other manufacturers and business men are doing.

I am so deeply interested that I find I am taking up much of your time, so I will leave many of the suggestions and details of association work to the report of the secretary. There are, however, many things that an association of this kind can do, and I will be as brief as possible in speaking of some of them.

First of all, we should cultivate a much closer relationship with the consumer of our product. I believe that if many of the manufacturers had a more intimate knowledge of the requirements that are demanded of their product there would be much pleasanter relations with the consumer. A policy of this kind seems to be the tendency in all kinds of business. For instance, if a closer confidence existed between the newspaper manufacturer and the publisher than I believe exists to-day, each would not think the other is trying to take an unfair advantage of him, and the simple question as to whether the paper is right, and will run over a printing press right, is one of the least of the things that closer relations should bring about. It is the newspapers and publications that to-day are largely responsible for the trend of public thought, and the people of this country rely upon the ideas that are conveyed to them through the public press in deciding what position they will take on public affairs.

There has been a diversity of ideas in the various suggestions that have been made by conservationists for the handling of our great problems of conservation. The bulk of what is said to-day that goes before the people emanates from the theorists. What we want to see done is to have the suggestions which may be followed emanate from the practical man. He knows better than anyone else, if he is honest with himself, as to what is right and what is wrong, and what should be done in connection with our great forests, and what should be done to maintain a uniform flow of our rivers, not only from the power point of view, but from the agricultural point of view, and there is no one that should be more interested in seeing practical forestry applied to every forest in these United States than the newspaper publisher, unless it is the paper manufacturer himself. In this respect their interests are identical, and when they are shown that this is the case, and they are willing to discuss practical methods with practical people, and then transmit them to the people through their publications, we will see something accomplished that will go down in history as doing more for the benefit of the generations to come than anything that has ever been done in the past. If you want a superintendent for your paper mill you do not go down on Wall Street and pick out a banker to do the work. You get hold of someone who has had experience and some practical knowledge of the work. So that is why intelligent men discussing our conservation problems should go to the man who has spent his life gaining practical knowledge and information through the management of companies interested in your forest areas.

If I look back a few years I know that those of us who are interested in our great Adirondack forests, from a commercial point of view, were looked upon as crooks and not to be trusted, but by association we have been able to show those who look upon the forest as simply a place to go in summer, that we want to see our forests so managed as to make them just as nearly self-supporting and self-perpetuating as possible. Work of this kind not only benefits the manufacturer, but the publisher, and the sooner we can have their confidence the sooner the right kind of conservation will be attempted.

The writing paper manufacturer may say that he is not interested in conservation, that it is simply the large users of ground wood pulp who should be interested, but I say to you that he is interested as he is dependent largely upon water to supply power for his plants, and a continuous power is largely dependent upon forest perpetuation, assisted in such ways as human minds can suggest.

It should be the policy of this association to encourage closer co-operation with all associations of other countries interested in the manufacture of pulp and paper, and particularly with the Canadian manufacturer. Our interests are mutual, and an exchange of ideas can do no harm, and should result in much good.

We should investigate the conditions of foreign trade; know what foreign markets require; what their consumption is, and then put the result of our findings before each manufacturer and see who can meet the requirements of the various countries.

One of the most important things that should be fostered by this association, and there has been much good work in this respect done in some of the divisions in the last two years, and, that is, for each mill to have an accurate cost system, so that it may know what each grade and weight of paper costs it where the price changes. I could talk for a long time upon this one subject alone, but I think you all must appreciate what the right kind of a cost system can give you. If you do not, and want to ask any questions in regard to it, go to any one of our secretaries or to myself.

It seems to be the popular thing among those seeking public office to-day to advocate compensation insurance for the working man. Most of these laws have been framed by theorists, with the result that they are unfair both to the employer and the employee, and that holds particularly true in this State, in which, I believe, there is more dissatisfaction, if this is possible, among the employed than among the employers. I believe our association should go on record as favoring a national compensation act. Plenty of time should be given to its consideration to avoid the enactment into a law of such ideas and theories as have been combined in the compensation act of this State.

We should do all we can to encourage courses of instruction in paper making in our schools and colleges. There are some schools already established; there are others that wish to add this course of study to their curriculum. I belive it will be a great advantage to our industry if we have more technically trained men in our manufacturing departments.

I am glad to see the interest that is shown in the establishment of a technical division in connection with our association work. An exchange of ideas among practical mill operators through this division should be invaluable. There has been no attempt made in providing the parent organization with funds to take care of this division, so it is left to those who are interested in this, if they wish to meet, to provide the means of handling it by those who are willing to join it, and the information and result of its meetings will be confined to this division and those who contribute to its support.

The information which I have been giving through our weekly letters in regard to the imports of chemical pulps and dye stuffs should be followed up, and we should have actual knowledge of the consumption of pulp wood, ground wood and sulphite, not only in this country but in foreign countries.

One of the important things which I inherited upon assuming office was the handling of the Tompkins case, which those interested had asked to have handled through the Association. The expense of this has been borne entirely by those interested.

I know there are some paper manufacturers who thought the association could not be conducted legally, and to overcome this criticism I deemed it advisable to retain an attorney that he might censor everything that we sent out through the association. I took this precaution as I did not want to assume the responsibility of our possibly overstepping ourselves and doing something that might not be construed as entirely within the law. The man selected was one who has had a large experience in handling association work. My suggestion would be that we should continue to retain someone in this same capacity.

In closing, I want to remind you again that the success or failure of this association, and of its modus operandi, rests entirely with you. You can make it by your united efforts one of the greatest organizations for good, and I am speaking now in the broadest sense of the word, that there is in this country today. You can give it as much or as little financial support as you want to, and the amount of work done must be measured to a large extent by dollars and cents. We all know that the path that leads to any great achievement is paved with many a knockout drop. Unless you are willing to face this condition and meet the many obstacles that are put in your way with that iron determination and confidence in yourself that you are right, you will not have the efficient organization to which you are entitled.

I hope that my criticisms will be taken in the spirit in which they are given, as I have in mind only what I believe to be for the best interests of the association. I, however, would be ungrateful if I did not say a word in appreciation of the time, the thought and assistance that many of you have given me during the past ear. I cannot say too much in praise of your loyalty and the sacrifices that I know some of you have made in attending meetings of the executive council. Those of you who have given the most time and thought are the heads of some of the largest companies in the country. When the rest of you will find as busy men as they who are willing to devote their time to the association work, the rest of you should be willing to follow and give it your support. I hope that those who have given me such valuable assistance will continue to give it, and that the number will be increased in support of my successor.

In conclusion I want to express my deepest appreciation to Mr. Bishop, Mr. Naylor and Mr. Ferguson, and to all of those in the employ of this association who have so ably assisted in the work, and who have done their part so well. Had it not been for their cooperation, suggestions and willingness to work I would not have been able to make the report which I am making today.

The report was received with applause and enthusiasm by all those present.

The next business was the reading of the following report by the acting secretary, H. H. Bishop, and was received with hearty applause:

Report of the Acting Secretary.

The speaker feels some diffidence in offering any report on this occasion, from the fact that he has no official standing as secretary of the American Paper and Pulp Association, which office has been vacant during the past year. Whatever he has done has been at the request of your honored president, to whose admirable report you have just listened. His real function is the more humble one of the secretary of the wrapping division.

It does not seem out of place to say at this time that the necessary attention to the affairs of the parent association has affected unfavorably to a degree the efficiency of his work for his own division, and he has been compelled to acknowledge that fact to the members of that group.

Your president has honored me with his confidence in permitting me in the performance of my duties to conduct correspondence, and send circular letters, mak ing him responsible for my acts by signing his name to all such rather than my own. I feel that this explanation is due to him in the event that you have any adverse criticism to offer of any such during the period of my acting, which has been since about June 1 last. Any errors or shortcomings of which I may have been guilty are, I assure you, of the head and not of the heart.

On an occasion like this it is well to reveiew briefly what has been done, and in doing so I will in the vernacular, "hit the high places," that I may not unduly weary you by recounting matters with which you are already well acquainted if you have read the circular letters issued from time to time.

Workmen's Compensation Laws.

On July 21 a letter was addressed to all manufacturers in New York State asking for information relative to the rates paid under a workmen's compensation law, which took effect in that State on January 1, 1914. Replies received to that inquiry showed an enormous advance in the rates of paper mills when compared with those in effect prior to January 1. As a consequence a similar inquiry has been addressed to manufacturers the country over, and we have on file a great many replies, indicating that the same condition is general in all States that have passed such legislation. No thorough synopsis of these replies has as yet been made. It is one of the matters, however, that may be deemed of sufficient importance to engage the attention of your officers during the coming year, with a view to some recommendation of measures whereby this industry may pay no more than its fair share of the liabilities incurred for vocational injury or death. Whether this shall take the form of mutual insurance or not is a matter demanding much research and study by those competent to judge, but it is certainly of vital interest to every one, and it is to be hoped will receive its due attention.

Refund of Duties.

On August 8, 1914 a general letter was issued calling attention to the fact that refunds of duties on pulp collected under protest between July 26, 1911, and May 12, 1913, were being refunded by the Treasury Department to applicants. We know that this was of service to several of our members.

Newsprint Data.

At the commencement of hostilities in Europe it seemed highly probable that the demand for newsprint paper would increase largely. It was deemed wise, therefore, to collect data in regard to available stocks and possible increases in production, and to keep the manufacturers advised of conditions as we found them from week to week. This service was appreciated we believe, but by the time the news division was organized in November the necessity for its continuance seemed to have disappeared, and it was not continued. It revealed the fact, however, that the expected extra demand did not materialize, and we hope may have been the means of preventing unwise expension of facilities for manufacture.

Pulp, Paper and Paper Stock Situation.

On August 19, 1914, we commenced the issue of a weekly letter covering the pulp, paper and paper stock situation as far as it related to imports, and this is still being issued. Your president mentioned this in his report. We need only add here that in order to provide this information with the accuracy that we do, we are compelled to arrange with a correspondent at each of the ports of entry to furnish the information which is obtained directly from the manifests of all vessels arriving. This involves an expense of $35 weekly, and if continued, as we presume you will wish it to be, will require provision for this expense of about $1,800 per annum. We felt at one time that this expense was excessive and asked the members if we had not better discontinue. The opinion was so overwhelmingly in favor of its continuance that no other course was open to us.

Circular Letters.

Since June 1, 1914, and up to January 1, 1915, there have been issued from the office 282 circular letters, of which number 61 have been addressed to the entire membership, and the remainder to the members of various divisions. Some comments have been made, we understand, to the effect that the issue has been excessive. It is no part of our plan to write unnecessary letters or incur unnecessary expense, and if there is good ground for complaint we should like to be advised of it. It must be borne in mind, however, that with the variety of subjects with which we have to deal there must be instances where our communications are interesting to only a certain number of those who receive them. It is difficult to discriminate with exactness, but the fact that 221 letters have been confined to special lists indicate that effort has been made to avoid cause for such criticism. Letters like these frequently require some thought and preparation, and they certainly involve considerable mechanical detail in preparing and mailing.

The regular correspondence is of very considerable volume, and it is not unusual to receive letters at intervals which demand either two or three hours research in our library in order to answer satisfactorily, or require an appeal for information to a number of other manufacturers in the same branch of the industry. The correspondence could be somewhat diminished in volume if members who receive inquiries from us would answer them promptly. We are frequently compelled to write "follow-up" letters requesting replies, which should be entirely unnecessary. We hope that there may be a gradual and permanent improvement in this particular.

New Divisions.

At the annual meeting of 1914 it was resolved that the form of organization should be altered, and that hereafter divisions should be formed which would be members of the parent association, and contribute to its support, their members becoming by virtue of membership in the division, members of the parent association without further payment of dues. Shortly after this meeting, divisions were thus formed by the manufacturers of writing paper, Mr. E. H. Naylor, secretary, and also by the manufacturers of wrapping paper, Mr. H. H. Bishop, secretary. With these two, the movement ceased for a time. It therefore became necessary for your president to urge the course upon others. There are now in existence newsprint division, who have elected Mr. Wilson Ferguson as their secretary, and are in active operation; tissue division, which elected your speaker as secretary, but have since advised him they think they need some one who can give his entire time; test board division which has only recently been formed, and which expects to elect a secretary at this time; chemical and mechanical pulp division, which organization has not been fully perfected at the time of writing this report. In addition to these the manufacturers of cover paper have formed a division with Mr. Emmett Hay Naylor as secretary, and the speaker has made an effort to organize subdivisions of the wrapping paper division.

The duties falling to the speaker, in connection with these various organizations, has made it necessary for him to spread himself out thin, with little satisfaction to himself or to the divisions interested.

Of manufacturers who have taken no steps to form themselves into divisions the most numerous are the manufacturers of board of various kinds. There is an organization of box board manufacturers in the west, of which Mr. Chas. R. White is secretary, but they are not affiliated with this association. The eastern manufacturers of box board have an organization known as the Eastern Box Board Club. This association cares for their statistical reports weekly and monthly, and use the association rooms for meeting purposes at infrequent intervals. Mr. F. S. Harrison, of the Talltown Paper Board Company, is chairman of this club. Aside from these there are the manufacturers of binders' board who held one meeting during the year, but failed to perfect an organization from lack of interest on the part of those who failed to attend. The secretary has lacked the necessary opportunity to urge this organization. He has been approached by one of the manufacturers of leather or heeling board with the suggestion that the field was worthy of cultivation, but again no time has been available to take the matter up. These are organizations which the incoming general secretary can well give attention.

There are other divisions practicable, such as blotting papers, building papers and specialties, which are also susceptible to effort.

Technical Division.

On September 29 we presented to the members a plan suggested by one of them to form a new division, to be called the "Technical Division," and whose province would be to gather and disseminate information concerning matters that had to do with actual production. We asked them to express an opinion as to its desirability. To this communication addressed to about 250 companies, 68 replies were received, 54 of which were favorable, 7 not interested and 7 undecided. May I be pardoned if I interject here a statement that the usefulness of the association is very much hampered by the failure of many to reply to communications of this character, and that there is room for great improvement in that direction.

As a result of this endorsement of the plan a meeting to form such a division has been scheduled for tomorrow, the 19th, at 10 a.m. in room 115, this hotel. It has been arranged that the official chemist of the association will make his report at that time, and that two lectures shall be delivered by engineers, one upon the subject of "Power, Light and Heat in Paper Mills," the other, "The Use of Ball Bearings in Paper Machinery." It will be noted that all of these subjects are of the deepest interest both to executives and superintendents of mills. If you have not already arranged to attend this meeting tomorrow, I would urge you to do so.

Declaration of Purpose.

On January 25 last we mailed to you a copy of the declaration of purpose and articles of association which have been adopted by the executive council as a substitute for the by-laws now in effect, together with an explanatory letter of some phrases which seemed desirable to further elucidate. These have been prepared under the advice of Mr. Clark McKercher, counsel for the Felt Manufacturers' Association, and formerly district attorney of the United States, in connection with the counsel of the association, Mr. James Boyd Potter. They have been carefully considered by both of these gentlemen, as well as by the executive council, and are offered setting forth clearly and definitely for your benefit and that of government officials exactly what the association purposes to do and what it purposes to avoid doing. They are submitted to you for your approval in compliance with the present by-laws, which prescribe that alterations and amendments must be consented to by a majority of the members at the annual meeting next following their adoption by the executive council.

We trust it may be your pleasure to act favorably upon them at the proper time. Additional copies are in the room for any who may be unfamiliar with the contents.

Export Problems.

The European war has brought to the front the question of the position this country shall take in supplying markets to which it has heretofore given but limited attention. So much confusion and misinformation was rife in regard to possibilities that we acted with great deliberation before addressing our members at all. We finally determined to ascertain whether any reasonable number of them were interested in the subject, and addressed an inquiry dated November 24 to ascertain the extent of the interest. To our surprise out of 333 replies received, 150 expressed a desire for all the information we could give, and since then we have been giving out such information as seemed to us to possess any value to those who expressed a wish for it. This list embraces the names of 72 manufacturers who are not members of the association, and it is hoped that our efforts may result in adding some of them to our ranks.

We believe it to be desirable that the whole subject should receive careful study, and that some plan should be devised by which all of our members may share in the development of foreign markets. Just what that course shall be we do not presume to say, and would like to see a committee appointed of say one from each division interested who would give the matter the thought and attention it requires. Valuable aid can doubtless be obtained from institutions like the National City Bank of New York, the American Express Company, the Chamber of Commerce of the United States, and from other sources more familiar with the problems than are your officers.

Every ton of paper that we can sell to some foreign country makes the bogie man of under-consumption in our own country that much easier to face. That the government is interested in extending aid is evidenced by the address of President Wilson at the recent meeting of the Chamber of Commerce of the U. S. at Washington. He is reported as saying: "The question arises, therefore, how are the small merchants, how are the younger and weaker corporations going to get a foothold as against the combinations which are permitted and even encouraged by foreign governments in this very field of competition? American merchants feel that they are at a very considerable disadvantage in contending against that. The matter has been many times brought to my attention and I have each time suspended judgment, because in this matter 'I am from Missouri,' and I want to be shown this. I want to be shown how that combination can be made and conducted in a way which will not close it against the use of anybody who wants to use it.

Cannot the committee which has been suggested employ its time and thought to good advantage in devising some adequate reply to the President's request?

Federal Legislation.

During the year just ended there has been enacted two laws, the so-called Clayton Anti-Trust Bill and the Federal Trade Commission bill. Under date of October 24 we issued a complete analysis of both bills prepared by the counsel of the association, Mr. Jas. Boyd Potter. From this you have no doubt obtained a very clear idea of their scope. It is the opinion of most of those consulted that the Clayton bill, intended to supplement and clarify the Sherman law, is itself so drawn that some device must be found to clarify it, and that device must of necessity be interpretation by the court of last resort. The Federal Trade Commission bill seems to be considered by the majority a good piece of legislation, although, as your president has said in his report, it fails to give the commission certain powers of decision that seem to be very desirable.

This commission, succeeding as it does to the duties of the bureau of corporations, will undoubtedly come to this association for all the information it can give concerning the paper industry. It is the policy of your officers, and we hope will be in the future, to render all the aid we can to the commission. To that end we believe it to be important that every member should appreciate the necessity of giving to our statistical department careful, painstaking and accurate reports upon any subject when they request information. We believe that if this association can be made the medium through which knowledge of costs, wages paid and other pertinent matters can be conveyed to the commission, and if our relations with the commission are of such friendly character as we aim to make them, then membership in this association is a privilege which no manufacturer can afford to forego, and we can present a united front to all problems that may arise, and assist in solving them in a manner just and equitable to all concerned.

On December 28 we sent you copy of an opinion rendered by Jas. A. Emery, general counsel of the National Association of Manufacturers, with which our association is affiliated through the membership of your president's company, in which he stated that in his opinion the trade commission had no power to indicate to manufacturers the limits to which they might go in reasonable restraint of competition, and that to obtain light upon this point an actual proceeding against some one complained of would be necessary. This is an unfortunate state of affairs, and a resolution by this body to the effect that such amendment be made to the law as will provide for this seems worthy of consideration at this time, and such action as you in your wisdom deem proper. We are justified in feeling that some reasonable understanding between competitors is no longer looked upon with the same degree of abhorrence that has been the case for some years past. The public and our legislators are apparently finding that in their efforts to abolish glaring evils they have visited destruction upon much honest endeavor. If the reaction assumes definite shape it is essential that we should be prepared for it, and that in any course upon which the members of our divisions may determine they shall be so fortified with accurate knowledge of producing costs, established upon a basis as nearly standardized as practicable, that their claims to asking a reasonable profit only may be substantiated beyond peradventure and without conflicting testimony.

Future Work.

As arrangements are being made, according to my understanding, by which there will be a general secretary for the parent association during the opening year, it is not appropriate that I should offer any recommendation as to future operation.

I will take the liberty, however, of relating to you an incident which came under my observation within a short time. I had occasion to visit this hotel at a time when a convention of wholesale merchants was in session, and from my position in the ante-room where I was awaiting an opportunity to speak to one of those in the meeting room I overheard an address made by one of the members. He was speaking upon the subject of the value of local associations as auxiliaries to the national association which he was addressing. In the course of his remarks he made this statement: "I want to say to you, gentlemen, that the local association to which I belong is a good association. The reason that it is a good association is because it has good members; men who are deeply interested in its welfare, who constantly offer suggestions for its work, and who take an interest in it every day in the week and month. I tell you, gentlemen, that when you have members of that kind you cannot fail to have a good association."

It impressed me that he had spoken a great truth, and one which was well worthy of careful thought on the part of members of this association. Your association will be of benefit to you or of no benefit, according to the use you make of it, according to the interest which you show in it, according to what you do yourself. You can make it a poor association, an average association or a leading association, according to your own conduct. I do not believe there is any question as to what you would like to have it.

This industry is of such magnitude, employs such a large amount of capital, and produces merchandise of such general use, that it should be one of the leaders of thought in association work. It should be one of the shining examples. Let us, therefore, in looking to the future, make up our minds that that is what the association will be—a militant association, with militant divisions and militant members.

The remainder of the meeting was devoted to the reading of the various committee reports and an address by Frank Stockdale, of the editorial force of A. W. Shaw and Company, publishers of "System and Factory," on the subject, "How to Keep Up with Rising Costs," which was especially prepared for this occasion.

Just at the close of the morning session the nominating committee made the report that Frank L. Moore was the candidate for president and F. J. Sensenbrenner was the candidate for vice-president. The report of the committee was accepted unanimously. In accepting the report President Moore said: "I thought I had friends, but this report makes me feel like the Dutchman who was walking along the street and noticed a long line of coaches and carriages decorated with flowers. He was curious to know what the demonstration meant and asked a passerby, who told him that the flowers were to decorate the graves of dead friends, and asked the Dutchman if he wished to send some flowers for graves of his dead friends. 'No,' he replied, 'the only friends whose graves I want to decorate are still living.' "

Presdent Moore then said that he very much appreciated the honor that was tendered him and was well aware of the responsibilities that it entailed. He added that the only reason he accepted the re-election was that the efficient organization that had been worked out was such as not to require as much time as in the past. He pledged his support to the association and asked for the co-operation of each and every member in carrying out the work of the organization. He paid high tribute to the work of the divisional secretaries in the past year, and expressed confidence that their good work will be carried on further if the proper support is given by the individual members.

The president then announced that the executive council would meet in the afternoon and elect a secretary and treasurer. The meeting was then adjourned until after the luncheon, held as a part of the social programme.

Immediately after the luncheon the manufacturers of Michigan met and discussed the question of establishing a school for paper and pulp making, at the University of Michigan, at Ann Arbor.

The afternoon session of the general meeting was devoted to the reproduction of motion pictures of one of the Strathmore Paper Company's mills and forest fire prevention, and the methods of fighting forest fires. This was followed by an address on export business by W. S. Keyes, in charge of the foreign department of the National City Bank of New York, which was a substitute for the scheduled address of John H. Fahey, president of the Chamber of Commerce of the United States, who was to talk on "The Federal Trade Commission—Its Opportunities." The meeting closed after a talk that was full of interest for the members by Edward F. Trefz, on "How to Keep Members Interested."

The executive committee reported that there was no election of a secretary and adjourned until Friday.

The Banquet.

The Banquet of the Association in the evening was a brilliant affair. Seven hundred and twenty-two representatives of the various paper companies sat down in the Grand Ball Room of the Waldorf-Astoria and were treated to the best that the hotel could provide and afterwards to speeches serious and mirthful until the break of a new day. Frank L. Moore, President of the Association, did the honors of toastmaster. In his address he said:

"Gentlemen, this is one of the proudest days of my life, not because of my re-election, but on account of the wonderful success of the association, which is still at the point where it is just starting." He then predicted a bright future for the association and expressed the wish that those elected to office this year will not only act for the welfare of the association, but also extend their activities far beyond the mere paper manufacturing industry. He advocated that the association promote co-operation with the other paper and pulp associations, particularly the Canadian association.

"As business men we must not only be honest with each other, but we must also be honest with the government and then the government will be honest with us," concluded the toastmaster.

The "permanent Chaplain of the Association," the Rev. Dr. Boynton next addressed the gathering. Dr. Boynton's sage counsel mingled with his generous humour made up a speech which gripped the audience.

"There was a time," said Dr. Boynton, "when there was no such thing as co-operation between various trades. The butcher, the baker and candlestick maker thought they had nothing in common. Now, these tradesmen realize that they have a great deal in common and that each is entitled to a fair recognition, and that each has much to gain by co-operation and camaraderie. It is only recently that the greatest scientists have learned the value of co-operation. They now realize that all science is merely the application of a universal principle. The same principle of comprehensiveness now reigns and rules in the business world as never before.

"Business men are learning the truth of the old adage that in union and co-operation lies the greatest strength. They are reaching the conclusion that the country does not exist for busines, but that business exists for the country."

Dr. Boynton was followed by the Hon. Wm. E. Humphrey, who spoke at great length on the various problems confronting this country, particularly in regard to business conditions. He took up the question of the tariff which he thought was the real cause of the present state of depression in business. So long as the American manufacturers were compelled to pay high rates for labor, he said, they should be protected from foreign cheap labor. The condition of business to-day, he said, is not due to the inefficiency of the American manufacturer, nor is it imaginary. The foundation of the industrial condition of this country is the tariff law, he added, and in his opinion, as the present law has been in force for about eighteen months, it affords a good basis for making comparisons, which are not to the advantage of the administration.

Mr. Humphrey's speech was followed by a stirring address from Edward F. Trefz, general field secretary of the United States Chamber of Commerce, who spoke at the afternoon meeting on the value of association work, and was called upon to address the members at the banquet. He said that the great trouble with the business man of to-day is that he confines his work to the development of his business only. He forgets, he said, that the duty of educating the masses is his and that it should not be left in the hands of irresponsible men. It is to the business men, said Mr. Trefz, that we owe all that we possess in civilization.

We are all enjoying civilization and prosperity, he added, because some people did not ask "What do we get out of it?" He cited instances of great inventors who died in poverty. Did Washington, Lincoln, or any of the great statesmen of this country ask "What do we get out of it?" So he said, when business faces great problems, they can be solved only through organizations that are national in scope. The greatest confidence in business is necessary, and then, he believes, in the morning light will come.

The climax of the evening was the address of the Hon. Job Hedges, whose philosophy, satire and delicate humor quite captured the big audience. After following the popular fallacies of democratic government, "rights," "special privileges" and points of law, the speaker laid it down that final solution of the industries and all business problems must be effected by the masses, but the original idea for the solution must be started by someone with a creative mind.

The banquet closed in the early minutes of the new day.

UNITED STATES NOTES

(Special to Pulp and Paper Magazine.)

The trustees of the bankrupt Battle Island Paper Company, of Fulton, N.Y., are very anxious that the affairs of the company will be brought to an early settlement. The matter of the sale of the Canadian timber land and the logs in the Mars river is held up pending the decision of the Canadian courts regarding the payment of various claims and liens filed by different Canadian creditors. An offer of $300,000 made for the property by the Ontario Paper Company, while still in force, has been changed, so far as the terms are concerned, so that only a comparatively small part of the amount offered would be paid in cash—the rest remaining in notes to be taken up from time to time. A meeting of the creditors was held in Chicoutimi on February 18, at which time the question of appealing the judgment of $36,950 on account of cutting logs and piling them in the Mars River, secured by A. LePage, was freely discussed.

For the third successive year, the petition for making three-tours in paper mills compulsory through a legislative act, was given a hearing at Boston, Mass., before the Legislative Committee on Labor, on February 15. The hearing was largely attended and was a long one, both the proponents and the opponents of the measure putting on many speakers. During the hearing several paper mills that have recently gone on the three-tour shift were mentioned and complimented on their thrift.

Eugene Baker, superintendent of the Erving Paper Mills at Erving, Mass., met with a serious accident last week while at work in the cellar of the mill. His coat caught on a set-screw in the shafting and he was drawn through the shaft. The power was stopped immediately, but not until the shaft had made about 25 revolutions. He was taken to the hospital in an unconscious conditions, with several ribs broken, numerous bruises and internal injuries.

The Russell Falls Paper Company, with mills at Russel, Mass., has sold its business and goodwill to the Russell Falls Company, which has been incorporated under the laws of the State of Massachusetts with a capital of $700,000. The new corporation will assume all obligations of the old concern.

Edward M. Hall, of Carthage, N.Y., has been granted a patent on an appliance for the manufacture of ground wood pulp of a more uniform quality with an increase of fifty per cent from the same water power. The patent is admitted to be valuable, and one that will tend to revolutionize the ground wood industry. An account of the formation of the Hall Process Company at Watertown, N.Y., to manufacture pulp from this patent, was recently mentioned in these columns.

The Eaton-Dikeman Company, Pittsfield, Mass., has received several large orders during the past fortnight for goods that were formerly made in Germany. The orders are for filter paper. This company recently perfected a process for the manufacture of this grade of paper and preparations are now under way for the installation of suitable machinery to manufacture same.

The paper manufacturing plant formerly owned and operated by the American Tissue Paper Company at Easton, Pa., has been sold by George G. Cross for William P. Gest, trustee, to a purchaser whose name has been withheld. The plant comprises four large mill buildings, repair shops, stables, 25 dwellings and 25 acres of land. It was built some years ago by Adolph Segal, leased for several years to the American Tissue Paper Company, and subsequently leased to the Butterick Company of New York. The plant originally cost $150,000.

New York is the greatest producer and user of wood pulp among the States of the Union. There are nearly 100 pulp mills within the borders of the State using annually one million cords of wood.

Advices from Ausable Forks, N.Y., state that the big paper and pulp mill of the J. and J. Rogers Company has been placed on short time, working nine hours a day.

That a price of $6.60 for a week of 50 hours is not a fair wage for women, who are required to perform an essential operation in the paper making industry of Massachusetts, is the opinion just handed down by the State Board of Conciliation and Arbitration in the case of the Valley Paper Company at Holyoke, and its employees in the rag sorting department, which the Board publicly investigated on January 22. The Board now recommends the employer pay the price asked by the employees, $7.50 for 50-hour week.

At the annual meeting of the Great Northern Paper Company, held at Millinocket, Me., the sum of $10,000 was appropriated by the officials towards the new $30,000 town hall in East Millinocket, which is now nearing completion.

To obtain material for the making of paper, American paper manufacturers are importing pulp wood from foreign countries. Large quantities have recently been landed at Baltimore, Md., for shipment to the mills in West Virgina, and the latest pulp wood laden vessel to land in Washington, D.C., is the Swedish steamship "Borg." She brought in 2,200 tons of wood from Konigsburg, Germany.

The appointment of a receiver to operate the Albany Paper Products Company, Albany, Ind., was asked in a petition just filed in the Federal Court at Indianapolis by the Marion Paper Company and others. The petitioners assert claims of more than $8,000, and allege the company owes more than $100,000. Preference of creditors are also alleged in the petition. Besides having a paper mill at Albany, the company has two leased plants at Chicago. The petition on file at Indianapolis says ancillary proceedings will be brought to bring these under a receiver. The company, in answer to the petition, says it is solvent, and that it has committed no acts of bankruptcy. The Muncie Trust Company, of Muncie, Ind., has been appointed receiver with a bond of $2,500.

Messrs. Price Brothers and Company, Limited

First Annual Staff Dinner.

On Monday, January 25th, the President and Directors of Price Brothers & Company, Limited, gave their First Annual Dinner to the staffs of Kenogami Paper Mills, Jonquiere Pulp Co., Chicoutimi (Logging Dept.) and Shipshaw (Power Dept.).

The Banquet was held in Kenogami at the residence of Mr. John Ball, the popular Manager of Kenogami Paper Mills, those present being Col. Sir William Price (president), Mr. G. H. Thompson (vice-president), Mr. W. S. Hofstra (director), Mr. John Ball, Dr. E. F. Fluhmann, Mr. Edward Flynn, Mr. R. S. Hall and Mr. Munro. Others also present were Messrs. R. Greig, C. Hunter, M. Joncas, C. Louthood, J. R. Brands, J. M. Rowland, F. C. Courcelle, A. Turner, G. D. Falkenberg, C. P. Bruce, J. Woods, E. G. Willrich, W. McCandlish, L. Grant, C. D. Waters, W. Brubacher, C. A. Gauvreau, W. Cairnie, J. Kavanagh, W. Buchanan, and W. H. Tait.

Covers were laid for 36 with Sir William Price as host. After discussing the excellent Menu, the toast to the King was honored with befitting loyalty. Mr. F. C. Courcelle in a few well-chosen words proposed the army, Navy and Auxiliary Forces, paying a fine tribute to the excellent fellows who are at the present time facing grave dangers every day in defence of our Empire. In the absence of Lt.-Col. J. McCarthy, Mr. G. H. Thompson replied and mentioned, in passing, the excellent work done in connection with the Valcartier Camp by Col. Sir Wm. Price, who had recently received the honor and dignity of K.B. from His Majesty King George, as a reward for his services. Mr. W. H. Tait then proposed the President and Citizens of the U. S. of America, and hoped that the present amicable understanding between America and Canada would continue. In replying, Mr. W. S. Hofstra thanked the company for their good wishes, and thought he could safely say that the American people as a whole were anxious to maintain the good feeling between the two countries, and in support of this he mentioned one or two measures that had been recently passed by the United States Senate which he considered proved what they said, and would do all they could to promote trade between Canada and America, one of the measures passed was the Panama Canal Bill, which reminded him of a little story, which unfortunately (through lack of space, alas!) we cannot print. It is a well known thing that "one thing brings up another," and Mr. Hofstra's memory being in excellent working order, he soon had the company in tears of laughter with a fund of anecdotes told in his inimitable manner.

Mr. John Ball then rose to propose the toast of the evening—"The President and Directors of Price Brothers & Co., Ltd." He said it gave him great pleasure to propose this toast, because he could honestly say on behalf of the Staff that they were genuinely grateful for the way in which the company studied the comforts of their employees, both in the mill and outside; any reasonable request was granted, and he trusted the company would reap their reward by efficiency on the part of their employees. He took this opportunity of congratulating Sir William, and said the Staff had thought this an excellent time for presenting the President with a silver Rose Bowl to show their appreciation of the honor conferred upon him in the New Year, and asked him to accept this small token with their best wishes for the future.

Sir William Price, who on rising, was greeted with prolonged applause, said that it was such an unexpected pleasure that he found difficulty in expressing his gratitude to the Staff for the kind compliment they paid him, and it gave him great pleasure to accept their beautiful gift, especially when it was accompanied with such genuine wishes. He expected to have to reply to a toast and had made one or two notes of things he wished to mention, but he was quite thrown off his feet by this kindness, and he hoped they would excuse him if he made but a brief speech. The directors and himself were more than satisfied with the way the mill was being run, and he was pleased to see the perfect understanding and co-operation between Mr. Ball and those under him. Of course, as they probably all knew, he was a lumberman, and until he and his directors started in the paper business at the Jonquiere Mill, he practically knew nothing about paper. However, their success at Jonquiere induced them to build Kenogami Paper Mills. It was hard work at first, getting a large mill into perfect working order, but he was very glad to see the various complications disappearing. He could say now that the mills were a going-concern, and that satisfactory state of affairs could only be maintained by everybody working together, the same as they were doing now, and if the staff would prove loyal to their employers, the company would be loyal to the staff.

Mr. H. E. Price, being unable at the last moment to attend, Mr. W. S. Hofstra rose to propose the toast, "The Staff of Kenogami Paper Mills, Jonquiere Pulp Co., Shipshaw (Power Dept.) and Chicoutimi (Logging Dept.)" and he said he was pleased the toast had fallen to him, as it enabled him to express his own appreciation as well as the company's for the smooth way in which all departments were running. They were fortunate indeed to secure a man with such ability and personality as Mr. Ball, and he thought that Mr. Ball's personality had inspired the rest of the staff, and he was glad it was so.

The toast was suitably replied to by Mr. W. Monro (Power Dept.), Mr. R. S. Hall (Jonquiere Pulp), Mr. R. Greig (Supt. of Kenogami), and Mr. Eugene Bergeron (Master Mechanic, Kenogami). The latter said he was one of the first to be employed at Kenogami, and could speak with feeling as to the attitude of the company towards their employees. It was rather difficult to express his sentiments in a language which was not his own, but he trusted that the company would accept his allegiance. With regard to Mr. Ball, he was proud to work under a man such as he was. He had seen managers who, when anything went wrong, said "let it go." Mr. Ball's reply was always the same—"Put it right."

During the evening a musical programme was arranged. Songs were sung by Messrs. H. Munro, R. Greig and C. P. Bruce. Mr. S. M. Julian gave a recitation and Mr. F. C. Courcelle contributed a song and monologue.

The evening finished with singing God Save the King, O Canada, and the Marseillaise and Stars and Stripes.

The Markets

CANADIAN MARKETS

The market conditions continue without much change. The news print situation has eased off considerably, and the producers are now looking for orders more keenly than they have for some time past. Prices are less firm, and it is felt that present production is enough to keep abreast of the demand for some time. Of late the shipment of news print abroad has fallen off some, owing to the decline in advertising, and the fact that the metropolitan dailies do not contain as many pages as they did a few months ago. The November government statistics show a decrease from the October figures, which were the highest for any month on record. Of the $1,064,634 in news print shipped in November last the United States took $878,482. In the last eleven months Canada has exported $3,950,012 in chemical pulp, $4,051,378 in mechanical pulp and $12,450,115 in news print.

In the book and writing line, business has picked up somewhat during the past few days, and the mills are a little busier. The manufacturers of book, bond, writing and ledger may have to increase their prices, owing to the new duty of seven and a half per cent, which they will have to pay on raw materials, such as sulphur, alum, sizing, resin, china clay, soft coal, clack, etc. Sulphur, china clay and resin have been free heretofore, and the duty on alum and sizing has been ten per cent. With the extra levy, it is felt by some of the plants that the time has come to increase prices to meet this advance. In the past few months the mills have absorbed a number of increases, without adding anything to selling quotations, particularly in sulphite, colors, etc., but most operators now feel that a limit has been reached, and they must get more for their product. The increase of duty on soft coal will alone amount to a considerable sum.

Another thing troubling the mills is whether owing to the increase of postage there will be less printing and not so many circulars sent out. When printing orders fall off, the mills feel the effect. It is said that several firms, who corcularize Canada with form letters advertising their goods or their business advantages, will henceforth mail such from points in the United States. Many of these concerns maintain branches in Canada at any rate. They may, therefore, decide to print their letters and other literature in the States, and mail it from the other side of the border, trusting to the international postal agreement for delivery by Canadian post offices. If this happens it will entail a loss to Canadian paper men, Canadian printers and Canadian distributors. The market for ground wood pulp continues only fair, and sulphite in all lines is easy in price. Wrapping and other lines of paper are moving fairly well, and business is expected to pick up materially next month. In the rag and paper stock market there is little doing, and there are no changes worthy of note.

Quotations, f.o.b. Toronto, are:—

Paper.

News (rolls), $1.95 to $2.05 at mill, in carload lots.
News (sheets), $2.10 to $2.15 at mill, in carload lots.
News (sheet), $2.20 up, depending on quantity.
Book papers (carload), No. 3, 3.75c. to 4.25c.
Book papers (ton lots), No. 3, 4c. to 5.50c.
Book papers (carload), No. 2, 4.25c.
Book papers (ton lots), No. 2, 4.50c. to 5.25c.
Book papers (carload) No. 1, $4.75 to $5.25.
Book papers (ton lots), No. 1, 5.25c. to 6.00c.
Writings, 4½c up.
Sulphite bond, 6½c. to 7½c.
Grey Browns, $2.35 to $2.75.
Fibre, $3.35 to $4.00
Manila, B., $2.85 to $3.25.
Manila, No. 2, $3.10 to $3.50.
Manila, No. 1, $3.35 to $4.00.
Unglazed Kraft, $3.90 to $4.50.
Glazed Kraft $4.25 to $5.00.

Pulp.

Ground wood pulp (at mill), $17.00 to $18.00.
Ground wood, $22 to $24, delivered.
Sulphite (unbleached), $39 to $43 del. in Canada.
Sulphite (unbleached), $40 to $44, delivered in U.S.
Sulphite (bleached), $54 to $58.

Paper Stock.

No. 1 hard shavings, $2.05.
No. 1 soft white shavings, $1.70.
No. 1 mixed shavings, 50c.
White blanks, 97½c.
Heavy ledger stock, $1.50.
Ordinary ledger stock, $1.25.
No. 2 book stock, 50c.
No. 1 book stock, 80c.
No. 1 Manila envelope cuttings, $1.20.
No. 1 print Manilas, 65c.
Folded news, 30c.
Over issues, 40c.
No. 1 cleaned mixed paper, 25c.
Old white cotton, $2.50 to $2.75.
No. 1 white shirt cuttings, $5.75 to $6.00.
Black overall cuttings, $1.70.
Thirds, blues, $1.50.
Black linings, $1.75.
New light flannelettes, $5.00.
Ordinary satinets, 95c.
Flock, $1.05.
Tailor rags, 90c.
Manila rope, 2c to 2¼c.
No. 1 burlap bagging, 90c.

Quotations f.o.b. Montreal are:—

Book—News—Writing and Posters.

Roll News, $40 to $43 per ton for large orders; $45 to $50 per ton for small orders.
Ream News, $45 to $47 per ton for large orders; $50 to $60 per ton for small orders.
Cover Paper 5½c. to 7c.
No. 1 Book, 5¼c to 6c per lb.
No. 2 Book, S.C., $4.50 to $4.75 in large quantities; $4.75 to $5.50 in small quantities.
No. 3 Book, M.F., $4.00 to $4.25 in large quantities; $4.40 to $4.50 in small quantities.
Writings, 5c to 7½c.

Sulphite Bond, 6½c to 8½c.
Writing Manila 5c.
Colored Posters 4c. to 5c. per lb.

Wrappings.

Grey Brown, per 100 lbs., car lots, $2.25 net; 5 tons $2.45; 2 tons, $2.55; 1 ton, $2.65; less, $2.75.
Red Brown, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, 3.15; less, $3.25.
B. Manila, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, $3.15; less, $3.25.
No. 2 Manila, car lots, $3.10; 5 tons, $3.20; 2 tons $3.30; 1 ton, $3.40; less, $3.50.
No. 1 Manila, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton, $3.65; less $3.75.
Kraft, $3.75 to $5.00.
Fibre, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton $3.65; less $3.75.
Fibre, $2.75 to $3.50.
Manila, B., $2.50 to $3.25.

On large orders to the jobbing trade some manufacturers are quoting 10 per cent off the above prices on wrapping.

Pulp.

Sulphite easy bleaching, $43 to $45 per ton.
News quality, $41 to $42 per ton.
Bleached sulphite, $54 to $59 per ton.
Kraft pulp, $3.60 to $4.00.
Ground wood, No. 2, $22 to $24, delivered United States.
Ground wood, No. 1, $15 to $16.

NEW YORK MARKETS

(Special to Pulp and Paper Magazine.)

The market for mechanically ground wood pulp during the interval has been fairly active, considering the heavy rains that have prevailed in the papermaking districts. The demand has been good, and prices have had a firm tone. Contract shipments have been normal, and the accumulations at grinding centres have been small. The demand for newsprint paper has not been very acitve and grinders are well satisfied with the way their product has been going under these conditions. The fact that contracts have been closed until well into the spring and early summer has a strengthening tendency on the market. Mill prices have essentially unchanged since the last report.

Opinions regarding the sulphite market vary to some extent. Some importers believe that the market will show sharp advances in the course of the next few weeks and others say that the tendency is downward. It is the opinion of paper manufacturers that they can buy all the pulp they need for immediate use at practically their own prices and are satisfied to withhold from any contract dealings at the present time.

Rags have been in poor demand, and the prices of all grades are weak, except roofing stock which has shown slight advance.

The unusually poor state of the board market has kept the price of old waste papers of the lower grades down to a very low level. Shipments to mills have been made with somewhat more favorable advantages to the buyer than to the seller. It is true that a slight advance in price of mixed papers has occurred since the last report, but the value is still such as to be the source of loss to the packers of this grade. Quotations as reported are 25 to 27½ cents a hundredweight. Soft white shavings are in poor demand, and the price is as low as at any time during the last year. The market value ranged between 1.75 to 1.80 cents a pound. Accumulations of all kinds of old papers are rather large. Old manilas and newspapers are available in unusually large quantities.

The demand for all kinds of papers has been rather quiet during the past two weeks. Newsprint has been in poor demand, and the shipments both from domestic and Canadian mills to the local publishers had been subnormal. Prices were reported to be fairly firm. The wrapping paper business has been rather weak, and demand has been about the same as in the last report. Writings, bonds and ledgers have shown a slight improvement. Book papers have moved along fairly well, except on contract with periodical publishers, who have been taking less than normal supplies for the last three months. Coated papers have been in poor demand, and prices have been unsatisfactory. The tissue market has been weak and featureless. No. 1 whites have sold as low as 40 cents a ream, and No. 2 white have been going quietly at 38 cents a ream in carload business. Box makers have been quiet, and this fact accounts for the poor demand for all kinds of boards. Prices are weaker than ever before, and it is the opinion of one of the largest manufacturers that there is not much hope of a better demand for some time to come.

Pulps.

Ground Wood, No. 1, $19 to $23, delivered.
Ground Wood, No. 2, $17.50 to $20, delivered.
Unbleached Sulphite, dom., 2.02½ to 2.25, delivered.
Unbleached Sulphite, imptd., 1.80c to 1.95c, ex dock, New York.
Bleached Sulphite, domestic, 2.05c, delivered.
Bleached Sulphite, impt., 2.75c to 2.90c, ex dock, N.Y.
Easy Bleaching, impt., 2.05c to 2.15c, ex dock, N.Y.
Unbleached sulphate, impt., 1.95c to 2.05c ex dock N.Y.
Bleached sulphate, impt., 2.80c to 3.00c, ex dock, N.Y.
Kraft Pulp, 1.95c to 2.05c, ex dock, New York.

Paper.

Quotations unchanged for all grades of paper:—
News, rolls, transient business, $1.95 to $2.05 f.o.b
News, rolls, contract renewals, $2.05, f.o.b.
News, side runs, 1.95 to 2.00, f.o.b., New York.
News, sheets, 2.20 to 2.30 f.o.b. New York.
Book papers, car lots, M.F.S., $3.75 to $3.90 f.o.b.
Writing paper, superfine, 13¾c to 17c, del. east of Miss. River.
Writing paper, extra fine, 11c del. east Miss R.
Writing paper, No. 1, fine, 9c, del. east Miss. River.
Writing paper, No. 2, fine, 8c del. east Miss. River.
Writing paper, engine sized, [illegible] to 8c, east Miss. R.
Bond paper, 5½c to 24c, delivered east of Miss. R.
Ledger paper, 8½c to 30c, delivered east of Miss. R.
Linen paper, 8c to 18c, delivered east of Miss. River.
Manila jute, [illegible] to [illegible], delivered.
Manila, wood, 2.65c to 3.25c, delivered.
Kraft, No. 1, $4 [illegible] to $4 [illegible] f.o.b. New York.
Kraft, No. 2, $3.35 to $3.50 f.o.b. New York.
[illegible], $24 per ton, delivered.
Wood pulp board, $40 per ton, delivered.
Boxboards, straw, $21 per ton, delivered.
[illegible], $22 per ton, delivered.
Tissue, [illegible], [illegible] f.o.b. New York.
Tissue, white, cylinder, 40c to 42½c f.o.b. New York.

PULP AND PAPER NEWS

The annual meeting of the Georgetown Coated Paper Mills, Georgetown, Ont., was held a few days ago, when satisfactory reports were presented for the past year. J. A. Willoughby was re-elected president and secretary, and L. E. Fleck, vice-president and general manager. The company have recently opened an office and warerooms in Toronto at 11 Duncan Street in the Atwell Fleming Printing Co.'s building where stock is carried. F. H. Gage is in charge of the Toronto office and warehouse.

Welland D. Woodruff, President of the Lincoln Paper Mills Co., Merritton, Ont., has gone to Jekyl Island, off the coast of Georgia, where he will spend a few weeks' holiday. He is a member of the Jekyl Island Club.

At the annual meeting of W. J. Gage and Co., Toronto, held recently, very good reports were presented for the past year, and the profit-sharing plan of the company, which has been in operation for thirteen years, has worked out successfully to all concerned. The following officers were elected: President, W. J. Gage; Vice-President and General Manager, S. B. Gundy; Secretary, A. G. Parker; Treasurer, H. H. Love; Superintendent, H. F. E. Kent. At the annual meeting of the Kinleith Paper Mills, of St. Catharines, held on the same day, Mr. Gage was elected President, Mr. Gundy, Vice-President and Managing Director, and Geo. H. Jefferson, Secretary-Treasurer, succeeding C. S. Pattenson, who is now Captain in the Nineteenth Battalion and on his way to the front. L. A. Dance is sales manager.

A federal charter has been granted to the Universal Wall Paper Co., Limited, with headquarters in Toronto, and share capital of $100,000. The powers of the company are very extensive, among them being to manufacture, buy, sell and deal in goods, wares and merchandise of all kinds. The incorporators are James Aitchison, John A. Donovan, Thomas O. Cox, Duncan McArthur and Peter R. Ritchie.

The new headquarters building of the National Sanitarium Association on College Street, Toronto, was formally opened a few days ago. The handsome and well appointed structure was erected as the result of the generous gift of one hundred thousand dollars from W. J. Gage, President of W. J. Gage and Co., Toronto, and the Kinleith Paper Co., of St. Catharines, who has taken a lifelong interest in fighting "the white plague."

British Columbia mills are now tendering on one of the largest lumbering contracts ever opened for world-wide competition. Through the British Government the Chamber of Deputies of France is asking for a supply of five hundred million feet of lumber to be used in the construction of one hundred thousand two-roomed houses. These small homes are to house the section of the population of France which has lost its all through the ravages of war. It would not be surprising if one of the British Columbia mills secured the contract.

A settler, writing from Northern Ontario, to a Toronto paper, complains that many of the residents are in a tight corner and at a farmers' meeting held at Porquis Junction recently, there was a general complaint that, owing to the failure of advances being paid on pulp wood already under contract, the embargo on shipment and the lack of a market for railway ties, many of the settlers are badly off financially and, unless something is done for their relief, a serious crisis will soon be reached. One resolution was passed to lay the true facts before the Ontario Government by means of a deputation and another to write a letter to Hon. Frank Cochrane, Minister of Railways and Canals, soliciting him to issue contracts for ties for the Transcontinental Railway.

E. L. Crooker, who has for some time been representative of the Laurentide Co. in Ontario, with headquarters in Toronto, left this week for New York City where he will act as United States representative of the company with offices in the Aeolian Building, 42nd Street. Robert Houch of the Montreal staff of the Laurentide Co., has been appointed to succeed Mr. Crooker in Toronto.

The annual meeting of the Provincial Paper Mills Co., Limited, was held in the head offices, Toronto, on February 17. In view of the rather quiet business conditions that prevailed during the past year the reports presented from the different plants of the company were regarded as very satisfactory. The prospects for the coming season were viewed favorably. The shareholders endorsed the action of the officers of the company in having contributed to the Patriotic, Red Cross, and other funds, and recommended that further contributions be made to such relief funds as the officers might deem best, to bring the amount up to five thousand dollars. The officers elected were:—President, I. H. Weldon, Toronto; Vice-President, T. A. Weldon, Thorold; Secretary-Treasurer, S. F. Duncan, Toronto; Board of Directors: I. H. Weldon, T. A. Weldon, S. F. Duncan, G. R. Copping, C. B. Gordon, S. B. Monroe, Ralph Emery, W. M. Loveland, and A. B. Connable. After the business proceedings, the directors were entertained to a luncheon at the National Club, as the guests of President Weldon.

S. F. Duncan, secretary-treasurer of the Provincial Paper Mills Co., Toronto, is spending a few weeks with his family at Dayton Beach, Florida.

The Don Valley Paper Mills, Toronto, report a large number of orders on hand. The plant is now under the superintendence of C. Nelson Gain, late assistant superintendent of the Kinleith Paper Mills, St. Catharines. Before leaving to enter upon his new duties recently, Mr. Gain was presented with an appreciative address accompanied by a handsome Morris chair. The presentation was made by Superintendent W. A. Anderson, on behalf of the staff among whom Mr. Gain was very popular, and all expressed best wishes for his success in his new and wider sphere of endeavor.

BRITISH TRADE NEWS

SPECIAL TO PULP & PAPER MAGAZINE

The Trade Board figures for January showing the British imports and exports of papers, boards, paper bags, envelopes, cards, and unenumerated papers, for practically the first month since August last, show the effects of war. Of course shipping on the various sea routes is well protected, but the set-back is due to the high tariff on freightage and the scarcity of labor and ships since the new year opened. Added to these difficulties are congestion at the various English and Scotch ports, and the great delays caused in loading and discharging steamers. All these new features that have lately sprung into existence very seriously handicapped the imports and exports of papers, and, consequently, the decreases in some instances are material. The imports in January were as follows, compared with previous years:

	1912.	1913.	1914.	1915.
	Cwts.	Cwts.	Cwts.	Cwts.
Quantities.	965,846	990,278	991,246	834,300
	£	£	£	£
Values.	586,462	611,699	631,043	437,715

Supplies are cut off from Germany, part of Belgium, and part of France, which also helps to make the decrease greater, but so far as the German imports are concerned and the Austrian, the British paper mill owner rather welcome the stoppage, as Germans are keen competitors in London and other large provincial centres. The supplies of reel paper from Newfoundland in January was 35,880 cwts. (compared with 104,535 cwts. in 1914), and from the States 9,060 cwts., compared with 8,301 cwts. in January, 1914. The total supplies of newsprint on and not on reels reached 226,606 cwts., as against 327,864 cwts. for the corresponding period in 1914. Increased supplies of coated paper also reached England from the States, the quantity being 193 cwts., an increase of 45 cwts. Canadian figures are not furnished.

* * *

The export trade has not suffered a very great calamity, and when compared with the German, Austrian Hungarian, French and Belgium and Russian (Finland) it is remarkable in all the adverse circumstances that the figures have reached such a total. The total for January, compared with previous years was as follows:—

	1912.	1913.	1914.	1915.
	Cwts.	Cwts.	Cwts.	Cwts.
Quantities.	287,369	322,031	330,394	213,77[illegible]
	£	£	£	£
Values.	414,764	434,941	432,548	293,630

Supplies to Germany, French and Belgian [illegible] are either cut off or partly reduced and added to these setbacks are the shipping difficulties. The supplies to Canada were: Writing paper, 117 cwts. (as against 176 cwts. in January 1914); printing paper 3,[illegible] cwts. (as against [illegible] cwts.); Unenumerated papers, 177 cwts. (as against 478 cwts.). The total export of newsprint and fine printing papers reached 186,461 cwts. as against 167,096 cwts. in 1914, 187,963 cwts. in 1913, and [illegible] cwts. in 1912. To all markets reduced supplies have been sent, owing to the high shipping tariffs, as it is impossible to make any profit after these are charged for. There is also great delays on the railways in England, supplies being held up for weeks at a time in order to facilitate the movements of troops. The greatest decreases in the exports are noticeable to markets such as Australia, Africa, India, New Zealand and Canada.

* * *

Considering the extensive scale on which paper-making materials were imported during the last three months of 1914, the imports in January would have been far greater if Canada had been amongst the supplying countries. This is a matter for the pulp makers of the Dominion to look into. The suppliers of ground wood in January were (quantities in tons of 20 cwts.):

	1914.	1915.
Sweden	6,729	11,108
Norway	29,807	11,620
Canada	1,294	. . . . .

For some unknown reason (except that the heavy buying in November and December changed matters) Canada sent no pulp in January, whereas supplies were received in 1912 to the extent of 2,020 tons and 307 tons in 1913. The total supplies of ground wood, sulphite and sulphate to reach the British market in January were, compared with other years:—Quantities: 1912, 84,906 tons; 1913, 72,247 tons; 1914, 75,511 tons; 1915, 58,223 tons.

The German, Austrian and part of the Finnish supplies are cut off, owing to the war. Water conditions in Norway have reduced the supplies from that country. The total supplies of sulphite and sulphate were 32,902 tons, as against 35,511 tons in January 1914, and 33,262 tons in 1913.

* * *

The Government of the Union of South Africa is advertising for applications for the leasing of lands for the cutting of papegrus which, with tambookie grass, is having the attention of the Commerce and Industries Department. It has been found, after tests and analysis, that the two wild crops are excellent paper-making materials. In view of the shortage of the supply of raw material for paper-making, the present seems an opportune moment to establish some scheme which will enable the supplies to be exported from Africa.

* * *

According to a Government report recently issued in London by the Foreign Office, the paper-making industry in India is not making the headway that one would expect. There are nine mills at work with a nominal capital of only £360,000, and the production in 1912 was 60½ million pounds of coarse papers. Of course, the imports of paper to India mainly come from the British mills, with which the Indian mills have to compete, and therein lies the great difference. While the production of paper in India was valued at £[illegible], the imports reached £[illegible], printing paper to the extent of £772,000, writing paper and envelopes to the extent of £[illegible]. Pulp and paper were imported to the value of £116,000 compared with £111,000 the previous year.

Messrs. Henderson, Craig & Co., Ltd., who are agents for some Canadian pulp mills, have issued their annual report of the 25th ordinary general meeting. Mr. Henry Johnson presided. The report states that after providing for the preference dividends, a dividend at the rate of 25 per cent for the year was declared on the ordinary shares of the company, and a balance of £3,405 12s 3d is carried forward to next year's account. Mr. Johnson stated that during the second half of the company's year operations had been considerably upset by the war. One of the directors and four members of the staff are in His Majesty's forces. There are Mr. A. D. E. Craig who is a captain and adjutant in the Queen's while Mr. H. Walker of the staff is with the London Scottish, and Messrs. A. and J. Hinson and J. Garside are serving in the Royal Field Artillery. The company has given £100 to the National Relief Fund.

* * *

The report of the half-year of the North of Ireland Paper Mills Co., Ltd., of which Sir John Hamer is president, shows a profit of £2,187, making with £43,219 brought forward, a total of £45,406. The directors have recommended that a dividend of 2½ per cent for the half-year be paid, carrying forward £42,906. For the corresponding half-year of 1913 there was a loss of £1,656, but a dividend of 5 per cent was paid. For the half-year ended June last there was a profit of £1,413, but no dividend was declared. The profits since 1912 have been as follows:—1912, £13,478; 1913, £2,591; 1914, £3,600. The dividend of 2½ per cent compares with 10 per cent in 1913 and 11¼ in 1912.

* * *

Seeing that dyes and dyestuffs are badly wanted now in the British paper industry for the production of colored papers, the interesting announcement is now made that the present conditions will be relieved so far as the Government is concerned. The first scheme submitted was not acceptable, and now a modified one has been presented, which includes the formation of a company with an initial share capital of £2,000,000, of which £1,000,000 will be issued in the first instance. This money will be loaned for 25 years at 4 per cent interest, payable out of the net profits. The modified scheme is smaller than the first one, but it will be enlarged if it proves a success. Another point about it is that the comparatively small amount of capital the public are asked to subscribe will be spread over a large number of men and the debenture capital put in by the Government is equal to the share capital, whereas in most commercial enterprises the share capital is usually three or four times the size of the debentures. This amended scheme should appeal to the public for support. Up to the middle of February it has not been adversely criticised, whereas the first one came in for a lot of abuse. Added to the scheme there will be a sum of £100,000 each year for 10 years for the purpose of research work. This will mean great developments and taking the new scheme as a whole the Germans after the war is over will have their work cut out to recapture what they have lost. Arrangements are also being made to develop trade in dyes with the Swiss makers.

* * *

Canadians may be interested to know that recent deaths in the pulp and paper industry in the United Kingdom have meant large fortunes being left behind. Mr. Berner, of Berner & Neilsen, pulp agents, has left £135,815; Mr. Yates, a director of the Wall Paper Manufacturers' Ltd., £35,702; Mr. Newling, £51,562; Mr. John Galloway, the well-known Scotch paper-maker, £85,299; and Mr. Alexand Duxbury formerly of one of the Lancashire mills, £78,837. British paper manufacturers of some years' standing are considered always to be wealthy men.

* * *

Some of the British paper mill owners are now giving their attention to the makes of paper usually placed on the market by the Germans and Austrians. Filter papers, for instance, were solely confined to the Germans who had a monoply, but now Messrs. Balston, of Springfield Mill, Maidstone, have introduced several superior grades which are highly commented upon. Consequently, when the war is over, the Germans will find some keen competitors to deal with, as well as an antagonistic feeling towards anything of German origin. Other large paper producers are working on different qualities, and one or two large firms have told me that in the course of a couple of weeks their new improvements will be announced. The great fear of the manufacturers is the old game of the Germans, who, in order to capture the market in any particular grade of paper, resort to price-cutting and reducing tariffs. As a result, also of their free imports the British mill men have to compete with the makers of the producing countries all the world over, and, needless to say, London and Manchester are the two dumping grounds of every country. This is the reason why British mills can produce papers cheaper and run their mills more economically than is the case in America or Canada. They must resort to everything on the minimum scale. All the large mill men are in favor of a tariff on foreign imports—that is from places outside the Empire.

* * *

Sulphite and sulphate prices are on a higher scale, and the cost of producing paper here is now considerably enhanced. The shipping rates is the cause, and though business is not plentiful, some good transactions have been closed for prompt parcels at prices satisfactory to the seller. As to the future, it is impossible to gauge anything. Every week a change comes. Stocks, however, are plentiful in England and in Scandinavia. Norwegians and Swedes say that they are getting some good prices and they also report an improvement in business, with a further tendency of prices rising. In London, quotations are nominally as follows, c.i.f. British ports:—

Bleached sulphite (No. 1) $60.04 to $67.20.
Sulphite Easy Bleaching, $48 to $48.50.
Sulphite, strong $40.90 to $41.90.
Unbleached soda, $41 to $43.
Soda Kraft, $41.90 to $42.

It will be observed on reference to past quotations that all prices have advanced except in the case of bleached sulphite.

* * *

There is a good inquiry for ground wood. Only prompt dealings are considered, and prices are increasing. Stocks in the mills are good. From Scandinavia comes the report that the low water conditions have hampered the grinders in December and two previous months, while the Swedes are well off with supplies. Arrivals in England from Scandinavia are on a small scale, and from Canada and Newfoundland none are reported. Prices are now nominally as follows, c.i.f. British ports:—

Ground wood moist (pine) $12.70 to $13.40.
Ground wood, dry, $24.60 to $12.60.

* * *

France is buying pulp on a small scale, and paying dear rate for it. The Dutch trade is very dull, and the Scandinavians says they cannot make any headway on account of the German pulp lying in Holland. Dutch buyers report that the market is over-stocked.

* * *

In the chemical trade, business is active. Sulphur, soda ash, alum and rosin, are dearer, and prices are varying lately. Stocks of rosin are getting depleted. Bleaching powder contracts can be closed on a lower basis, than was the case in December, on export. Alum is $1.20 dearer per ton. About 12 cents is added to rosin prices. American is also scarce. Soda crystals, saltcake, and ammonia alkali are unchanged in values since last report.

China clay exports are hampered by the shipping troubles and production curtailed. About 5 per cent more is charged for all other fillings.

* * *

The weekly trade between Canada and the United Kingdom for the two weeks ending February 5, was as follows:—Exports to Canada: Printing paper, 1,113 cwts.; writing paper, 61 cwts; paper hangings, 14 cwts.; paper stock, 51 tons. Imports from Canada; Packing paper, 36 reels; coated paper, 4 cases; toilet paper, 76 cases; wood pulp boards, 1,680 cwts.

* * *

Messrs. Sindall & Bacon, who do a great deal of research work for the Colonial Governments are now commissioned by the Queensland authorities to make a full report on the paper-making qualities of the Prickly Pear—a new fibre that has recently come to notice. The report will be awaited with great interest for publication.

* * *

Judging by the public speeches that are made in London and elsewhere lately, the opinion prevails that Canada will enjoy a time of prosperity when the war is over. The "World's Paper Trade Review," a weekly journal in London, in its editorial column points out that the Canadians are very wisely preparing themselves for eventualities in the paper trade, and says that while these preparations are being made, British manufacturers are lacking in their enterprise and energy. There is no doubt that now is Canada's time, and the quicker the markets are gripped, the better will be the results.

THE BRITISH MARKETS.

London, February 13, 1915.

After the dull state of the British paper industry exports in January, there is now a slight improvement, and if things go on as they are at present the February figures will not be very disappointing. The scarcity of shippin, high tariffs, and war insurance are the great "bugbears" at the present and mills are reluctantly compelled to wait. During the first two weeks of this month some good shipments have been made to foreign and Colonial markets. On home account trade is not too brisk. Newsprint, of course, is still finding a good continuous demand on account of war news, and most of the daily and weekly newspapers are now back to their normal size again. Generally, it may be said the newsprint trade is very fair, and prices range from 1¼d to 1½d a pound, less the usual percentages. Norwegian newsprint can be bought for 1⅛ and 1d less 2½ per cent. Many buyers are, however, holding back in the hope of getting a reduced price in the near future, but this anticipated turn of events may never come off, when one considers the price of mechanical, with its rising tendency. Stocks of newsprint are plentiful at the various mills and the delays on the railways are causing trouble between the manufacturers and consumers. Writing papers, wrapping and packing papers, in addition to boards of all kinds, are only enjoying a moderate trade, and business in these lines might be much better. This state of things is fully expected after the stocks laid in by buyers in November and December.

LATE NEWS.

Among those from Canada, who attended the annual meeting of the American Pulp and Paper Association in New York City, were T. J. Stevenson and George E. Challes, of the Riordon Pulp and Paper Co., Montreal; J. B. Beveridge, of the Dryden Timber and Power Corporation, Dryden, Ont.; O. H. Moore, of the Hinde and Dauch Paper Co., Toronto; Charles V. Syrett, of the Victoria Paper and Twine Co., Toronto; A. M. Huestis, of Toronto, and others.

W. E. Stavert, of Sault Ste. Marie, Ont., President of the Spanish River Pulp and Paper Mills, who has been spending the past few weeks in the Old Country on business, has returned home.

Mr. J. O. Jenssen, of the firm of G. D. Jenssen and Co., mill architects and engineers, has been making extensive trips recently in the interests of his company. Mr. Jenssen is going after business in an aggressive way. For four years he was connected with pulp and paper consulting engineers, and for three years was chief engineer on the construction of the Norddentoscher Cellulosefabrik, Konigsberg, Germany. For the past five years he has been in charge of the engineering department of the Riordon Pulp and Paper Company, Ltd., Hawkesbury, Ont.

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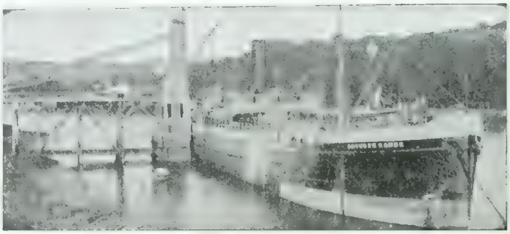

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Freight Rates

As readers are doubtless aware, the Canadian railroads have made application to the Board of Railway Commissioners for permission to put into effect a general increase in freight rates between points east of Port Arthur. The first hearing before the Railway Commissioners was held at Ottawa on March 1st and 2nd. The railways' contention is pratically that the present return on net operating income is unduly low as compared with the property investment of the companies, which is the result of constant increase in operating expenses, such as wages, cost of materials, etc.

At the hearing the railroads did not submit evidence to show that existing rates are unreasonably low or unfair. The application was constructed on the plea that the railroads require more money in order to meet fixed obligations, and give a reasonable return on the investment. Further hearings are to be held, and it is expected that more detailed information will be furnished at a later date in support of the proposals.

Among those who appeared before the Board was Mr. J. F. Orde, K.C., who explained that he was holding a "watching brief" for the Dominion Government, and that it was his purpose to watch the case in the interests of the public, and to give any assistance possible to all who might require it. He also said that, while he would make no definite statement at this time, he felt that the railways were making an extraordinary request and at a most inopportune time. Further, Mr. Orde stated that there was a question in his mind as to the procedure being followed, and he was not sure that it was one contemplated in the Railway Act.

With the case of the railways so incompletely presented it is impossible to give it anything like full consideration, and it would be unfair at this time to attempt any criticism.

It might be noted, however, that in presenting their arguments in the recent hearing the railways did not go about the matter as those whose interests are affected might reasonably expect. They made no statement of the extent to which their earnings must be augmented to overcome increased expenses and disturbed industrial conditions. They made no estimate of the amount of revenue which they expect would accrue from the increased rates. They did not state to what extent they are already benefitting as a result of the increase in international rates recently put into effect. The public generally would have much greater confidence in the justice of the case of the roads, if they were more candid along these lines.

Canadian pulp and paper interests take practically the same view as that held by Mr. Orde. They wish to hear the whole case of the railways and to give it careful study. They trust that in a matter of such vital importance to Canadian industries all interests will be heard, and that there will be no undue haste in reaching a decision. Fairness between all branches of national life — railways, manufacturers, importers, merchants and all others, is what they would like to see. This is no time for one class of activity in Canada to endeavor to secure an unfair advantage at the expense of others. Pulp and paper manufacturers will await with interest the developments in the course of the next hearing.

Pulp Wood Rates

A decision which will have far reaching effects in the relations between Canadian and American roads and shippers of pulpwood was handed down by the Interstate Commerce Commission on February 19th last. The question involved was that raised by the International Paper Company and others against the Delaware and Hudson Company and others, in which the plaintiffs complained that "joint through rates higher than were maintained for many years, published by Canadian carriers and concurred in by carriers in the United States for transportation of pulp wood from points in the Dominion of Canada to points in the State of New York are unreasonable."

The Commission held: (1) That the extent of the Commission's jurisdiction over the joint rates involved would be to require the United States carriers to cease and desist from concurring in such rates, thus leaving the traffic to move on combinations of rates to and from border points.

(2) That the rates in question were found to be reasonable by the Board of Railway Commissioners for Canada, after a hearing at the suggestion of the complainants herein, and the findings of that Board are entitled to weighty consideration by this Commission.

(3) That the rates were primarily published by Canadian carriers for transportation largely within the Dominion of Canada, and as the increases complained of accrue almost wholly to Canadian carriers, the Canadian Board was the proper tribunal to determine the reasonableness thereof.

(4) That the relief prayed for by complainants should not be granted.—Complaint dismissed.

The New Tariff

On February 11th, the Hon. W. T. White, Minister of Finance, introduced into the House of Commons a customs tariff which will make an unprecedented condition in Canadian finance and industry. The great war raging on the other side of the water has extended its influence immediately into the coffers of the State. and it is necessary for Canadians to make up some thirty million dollars, which amount is lacking this year on account of the decrease in imports. Very few classes of imports are exempt from the war tax, luxuries are particularly heavily taxed, and wines are singled out for heavy assessment.

In the Pulp and Paper schedule only printing paper, of which Canada imports practically none, also matrix paper, which is of use to the publishers of newspapers in stereotyping, are exempt. Every other class will be subject to duties of 5 per cent under the British Preferential, 7½ per cent under International, and 7½ per cent under the General Tariff.

All paper making materials and machinery are subject to a tax. Pulp, sulphur, low grade coal, chemicals of all kinds, will be subject to duty. It may be expected that in general the duties will not harm very much the Canadian producers of paper, except for the possible complication of securing high grade pulp at such a price as to make a profit. The manufacture of fine papers should be stimulated. Board manufacturers should also be stimulated to a certain extent. Other lines will not notice the difference except in that manufacturing costs will be raised by a small percentage. In general we can look for a slight benefit to the Canadian Pulp and Paper industry through the new tariff.

When conditions resume something like a normal aspect in the course of time, the manufacturers of paper would undoubtedly like to see some tariff changes which would place paper making on a better basis. Meanwhile they intend to shoulder with a good heart the burdens which they, with all others in the country, must bear.

Australia Wants Paper Boards

The Department of Trade and Commerce, Ottawa, announces that it has received from Mr. D. H. Ross, Trade Commissioner at Melbourne, a packet of paper boards containing twelve sample sets prepared by an Australian firm manufacturing photographic materials to illustrate the class of materials hitherto obtained chiefly from Germany and Sweden. The inquirers are very desirous of receiving samples and prices from Canadian manufacturers. Prices should be quoted per ton f.o.b. at port of shipment for 50 and 100 ton lots securely packed. The paper boards should be shipped in rolls 31 inches wide and about 26 inches diameter on wood centre with about 2 inches bore to take spindle. The reels should be securely fastened to prevent them from telescoping during handling. The firm in question state that they consume from 159 to 170 tons of all kinds per annum. Interested Canadian manufacturers may inspect the samples above referred to on application to the Department of Trade and Commerce, Ottawa. (Refer file No. A 1426.)

The following is a list of the samples sent, giving particulars in regard to quantities, packing, etc:—

Sample "B." German best quality wood middle basis 63 pounds, ream (480 sh.) 20 x 25.—Sample "T." Swedish wood board middle basis 73 pounds, ream (480 sh.) 20 x 25.—Sample "D." Swedish wood board middle basis 126 pounds, ream (480 sh.) 20 x 25.—Sample "S." American newsboard middle basis 73 pounds, ream (480 sh.) 20 x 25.

German pulp boards: Sample "U." Basis 73 pounds, ream 480 hs., 20 x 25.—Sample "N." Basis 300 sh. per 50 ko. 22 x 32.—Sample "O." Basis 200 sh. per 50 ko. 22 x 32.—Sample "P." Basis 182 sh. per 50 ko. 22 x 32.

COUNCIL OF NEW TECHNICAL SECTION ADOPTS CONSTITUTION

Meeting of the newly elected Council at the Forest Products Laboratories of Canada, Montreal, March 5th, 1915. Present: Mr. C. B. Thorne, Mr. Dan Daverin, Mr. T. L. Crossley, Dr. J. S. Bates, Mr. R. L. Campbell. A tentative constitution was drawn up and approved as follows:—

Constitution.

The Technical Section is provided for under Article 14 of the Constitution of the Canadian Pulp and Paper Association. This Section is an organization of individuals apart from the activities of the main Association.

Article 1. Name.—This organization shall be known as "Canadian Pulp and Paper Association—Technical Section."

Article II. Objects.—The objects of the section shall be to stimulate interest in the science of pulp and paper making in Canada, to provide means for the interchange of ideas among its members and to encourage original investigation.

Article III. Membership.—There shall be two classes of members: (1) Members—entitled to vote; (2) Associate members—not entitled to vote.

1. **Qualifications for Members.**—Any person who occupies or has occupied an executive technical position in the pulp and paper industry; anyone occupying a subordinate position in the pulp and paper industry who has had a satisfactory technical education; anyone who, though not having had a technical education, has special qualifications and experience.

2. **Qualifications for Associate Member.**—Any person who will support and assist the aims of the Technical Section, and who, by virtue of his qualifications, is likely to further the work of the Section. These members may attend all official meetings of the Section and have the right to take part in discussions.

Note 1.—Anyone merely furnishing material or supplies to the paper trade cannot become a member of the Section.

Note 2.—Any Associate Member, who in the opinion of the Council satisfies the requirements of Class 1, may become a voting member.

Article IV. Election of Members.—Each candidate for membership shall be proposed and seconded by members of the Technical Section, and shall be balloted on by the Council of the Technical Section, a majority of whose votes shall be necessary for election. The Council shall also decide as to which class of membership the candidate is entitled.

Article V. Dues.—The annual dues for voting members shall be three dollars and the annual dues for associate members, two dollars, payable at the beginning of the calendar year. A member who has not paid at the end of the year is suspended.

Article VI. Officers and Council.—The officers shall be a Chairman and a Vice-Chairman elected for one year by the members of the Technical Section at the annual meeting, and a Secretary-Treasurer who shall be the regular Secretary of The Canadian Pulp and Paper Association.

The Chairman and Vice-Chairman with three Councillors elected from the Technical Section, shall constitute the Council of the Technical Section. The present Council shall serve for one year, at the end of which time three Councillors (in addition to Chairman and Vice-Chairman) shall be elected as follows: One to retire at the end of one year, one to retire at the end of two years, one to retire at the end of three years, and thereafter one to retire every year, and one to be elected in his place to serve for three years. Retiring members of the Council (other than Chairman and Vice-Chairman) are not eligible to re-election as Councillors for one year, although they shall be eligible for the office of Chairman or Vice-Chairman. It is desirable that the Chairman, Vice-Chairman and three Councilors be chosen to represent the various branches of the industry, viz., book and writing, news and wrapping, chemical pulp, mechanical pulp, board and miscellaneous.

The Chairman, Vice-Chairman and Secretary-Treasurer shall perform the usual duties of these offices. The Council as a whole shall pass on membership, attend to business between meetings and have general charge and control of the affairs of the Technical Section.

Article VII. Meetings.—The Technical Section shall hold at least three meetings annually, if possible. The annual meeting for the election of officers shall be held at the time of the annual meeting of The Canadian Pulp and Paper Association. Two additional meetings may be held as determined by the Council. Upon the invitation of a member of the Council, non-technical members may be admitted to the meetings of the Technical Section. Meetings are to be called in writing, and every member is to receive due notice of any meeting with a programme of what is to take place.

The proceedings of the Technical Section, upon the approval of the Council, may be inserted in the official journal of the Section.

Article VIII. Amendments.—The constitution may be amended by the members present at any regular meeting of the Association by a two-thirds vote of the members present, provided that such amendment shall be submitted to the members in a printed or written notice at least thirty days before such meeting.

This article may be suspended, however, by a unanimous vote of the members present.

Other Business.

It was moved by Mr. Daverin and seconded by Mr. Thorne: "That until the next general meeting of the section, the Pulp and Paper Magazine of Canada shall be considered the official journal of the Technical Section."—Carried.

The following matters were decided upon by the council:—

1.—It is understood that the Council acts as a committee on Constitution and By-Laws.

2.—It is understood that the Council will act as an editorial committee, with powers granted to the Chairman and Vice-Chairman to decide on papers, etc., which shall be accepted by the Section and with powers to approve and prepare material for publication in the Pulp and Paper Magazine of Canada or elsewhere from time to time.

3.—It is also understood that the Pulp and Paper Magazine of Canada will grant a definite space for the publication of proceedings and papers of the Technical Section, so that the material will be kept together in a definite place, according to the wishes of the Committee.

For the present at least, the Forest Products Laboratories of Canada will try to abstract the current technical literature on pulp and paper, and furnish these records for publication in the Pulp and Paper Magazine.

3—The question of establishing standing committees on standard methods of testing, standards for pulp and paper and other materials, technical education, etc., will be left for consideration at the next general meeting.

4—If possible the next general meeting will be arranged for the early part of June. The place of meeting will be subject to the wishes of the members. The members are also requested to suggest topics for papers and discussions and the Council will then try to have suitable papers arranged for.

A. G. Campion, Belgo-Canadian Pulp & Paper Co., Shawinigan Falls, P.Q. Chairman of News Section, Canadian Pulp & Paper Asociation.

5.—The Secretary-Treasurer was instructed to send to the various pulp and paper mills and to certain others copies of the constitution drawn up by the Council, together with a covering letter outlining the above proposals, with the request that the names of those desiring to become members of the Technical Section be submitted, with records of their qualifications, to the Council, in order that when the Constitution of the Section is finally drawn up there may be no delay in securing a large and active membership.

It is also hoped that the proposed constitution will be digested and discussed, with a view of securing a solid basis of organization at the first regular meeting.

The Paper Trade of Japan

Some time ago the Fuji, Oji, and Kiso paper mills had an agreement under which the Fuji paper mill alone exported "zara" paper to the amount of 1,000,000 pounds a month. The Oji mill has recently installed additional machinery capable of turning out monthly 1,000,000 pounds of "zara" paper of 100 inches width. The agreement was therefore revised, and it was arranged that the Fuji mill should export 750,000 pounds, the Oji 250,000 pounds, and the Kiso 100,000 pounds, while agreements for a common price were also made to avoid competition and bounties on exports were to be given, as arranged before, out of the funds of the Papermakers' Association.

Of the Fuji mill shipment one-third is to go to Shanghai and Tien-Tsin and two-thirds to South China, the South Sea Islands, and Manchuria. The Oji mill's exports are to go to Hankow, and the Kiso mill's to Korea and North China. The first two are to export through the Mitsui Co. and the last two through the Nakai Shoten.

For some time past, says the Asahi (Osaka), shipments of the "zara" paper have frequently failed to reach half of the 1,000,000 pounds disposable, owing to the briskness of home demands, but the mills have increased their plant, and the home market is dull, so there is now a danger of congestion of stocks. As exports of paper from Europe to South China, India, Manila, Java, and Australia have stopped and stocks are running short, the three paper mills named are considering means of extending their markets to these places.

Japanese merchants interested in the manufacture and sale of unglazed paper for newspaper printing (as distinguished from high-class printing paper) expect an active season next spring.

Because of the great demand for newspapers occasioned by the outbreak and spread of the great war, the demand and supply of unglazed paper in Japan were for a time almost equally balanced. Only when the demand became somewhat fixed and the new workshops of the Oji Paper Mill were completed, and assured the additional production of 2,500,000 pounds per month, did the supply begin to exceed the demand by 3,500,000 to 4,000,000 pounds a month. Of this amount 1,000,000 pounds are exported to China, and a further increase is expected. To insure the further development of the trade, however, it is considered essential to extend the market to other parts of the Far East, namely, to Vladivostok and British India. A resolution to this effect was passed by the representatives of paper mills at a recent meeting, with an additional declaration in favour of increasing the maximum of subsidies granted to those engaged in the business. A scarcity of printing paper for the press is being complained of in Europe, but in China there is still some held in stock, and no serious rise of price has been recorded. The rate rules at about 2.20 yen ($1.0956) per ream. But as the stock becomes exhausted the Japanese merchants will be able to export unglazed paper to China on lucrative terms.—(U. S. Commerce Reports.)

PROGRESS IN PAPER-MAKING CHEMISTRY

REPORT OF PROF. RALPH H. McKEE, OFFICIAL CHEMIST TO AMERICAN PAPER AND PULP ASSOCIATION FOR 1914

In the knowledge that the supply of pulp woods used at present is limited, and that about twenty years hence the great bulk of paper made in this country will have to be produced from other fibers than those used now, many workers are interested and working on materials that are likely to prove acceptable as surrogates or substitutes for spruce and other woods.

Solution of the problem that confronts us fall into two classes: the first is where trees formerly considered inferior are found with slight modification of treatment to give fair quality fibre for news and other inexpensive paper, thereby conserving the more valuable woods for use for chemical pulp. The Forest Products Laboratory has done much valuable work along this line and mills are beginning to see the use of tamarack, jack pines, Douglas fir and other similar woods.

The second solution lies in the use of waste fibrous materials or crop plants as papermaking material.

There is every reason to believe that the enormous quantities of waste flax straw in the North Central States and of cotton seed hull fiber in the South will soon be made to yield a large tonnage to take the place of rag fiber. As substitutes for wood, sisal waste and sugar cane fiber deserve to be considered, but the large tonnage will have to be be supplied from planted materials, partly by reforestation, but more largely by quick growing woody materials not now much used. The two materials that promise most in this respect are bamboo in the south and hemp in the north. One northern mill by acreage planting trials conducted several years ago, reached the conclusion that when wood reached $12 a cord, then it would pay to plant hemp as a source of fiber. From present wood prices, we shall not have to wait long before hemp will be in the digesters.

Utilization of Pulp Waste.

Pulp mill waste is giving increasing trouble to water courses. The waste from mechanical and soda pulp mills is comparatively harmless but that from the sulphite pulp mills is ordinarily considered undesirable and is being legislated against.

The methods tried for its disposal are in four groups —namely, irrigation, artificial biologic treatment, infiltration and evaporation. The first three yield no return and can only be applied when the climatic and soil conditions at the mill are favorable. Evaporation is too expensive unless the partly evaporated material can be used for tanning, coal briquet binder, or roads as a dust preventative in competition with oil or in some other manner.

Waste Sulphite Liquor.

The earlier promises of the use of sulphite waste as a true tanning material are now thought to be largely without basis, all it seems to do is to serve as a partial substitute for weighting materials like glucose. A use may be found for waste sulphite liquor as a briquetting binder for coal slack, but the method has not yet been adequately developed and price of coal is still too cheap in this country to make briquetting of coal slack interesting from a business standpoint. As a dust preventative, waste sulphite liquor is satisfactory but with its large content of water, freight charges prevent it being shipped any considerable distance from the mill.

A really satisfactory solution of the sulphite waste problem is yet to be found. The transformation of the glucose content of the liquor into alcohol, a process by which three Swedish mills are making about a million and a quarter gallons of alcohol a year seems most promising. Two mills in this country are now producing alcohol from waste sulphite liquor. The yield is ordinarily about 15 gallons of 95 per cent alcohol, a ton of sulphite pulp, but under the best conditions, it is said to be possible to increase this to fully twenty-five gallons a ton of pulp. However, the slops, after the alcohol extraction, are fully as objectionable as the original waste liquor.

New Pulp Processes.

Of the new pulp processes, the Konig process, using successive treatments with 4 per cent. ammonia and 0.5 per cent. sulphuric acid, gives about the same yield of pulp as ordinary methods, but the byproducts of alcohol and rosin are of much more value. It is also said that the cooking liquor after use has value as a cattle food.

Success of this process seems to depend largely if not entirely on a decrease in the price of ammonia and the successful use of the byproduct as a fodder. In this connection, it should be said that it is very probable that Haber's ammonia synthesis from hydrogen and nitrogen gases, commercially developed by one of the large German chemical companies, is destined to lower considerably, the price of ammonia.

The Use of Liquid Sulphur Dioxide.

Efforts are being continually made to increase the amount of free acid in the sulphite digester. Patents have lately been taken out by Messrs. Wolf and Moore of the Burgess Sulphite Company for a scheme whereby gas from liquefied sulphur dioxide is forced into the digester after filling and injecting steam.

The Dyestuffs Question.

The coal tar dye situation in this country is bad, but there seems little immediate help in sight. Importations are coming in, but not in large amounts. American dyemakers are in a position to make only a minor part of the tonnage of dyes needed by American papermakers and if importation should cease the stocks on hand would soon vanish. Many papermakers are conserving their stocks by declining orders for intensely colored papers and turning out whites and tints that require but small amounts of dyes. Steps can be taken to obtain in the future an American source of most dyes but to do so the price will have to be paid, and I doubt if the paper industry is willing to pay its share.

High Bleaching Costs

Much as I would like to the time at my disposal does not permit me to discuss several other questions which deserve your consideration such as the excessively high bleaching cost of many American pulp mills, the equal ly high losses in steam and chemicals of many soda mills, and the still greater monetary losses in many mills due to fiber being allowed to go out with the waste water into the river.

In asking me to speak before the Techincal Division, Mr. Bishop asked me to offer suggestions as to what might be accomplished by such a division.

The Formation of a Technical Division

Before touching this question, allow me to offer my congratulation to men here gathered together. This meeting and the organization of this division, promises to do more towards putting this industry on a sound and paying basis than any previous step made by the American paper and pulp industry. It is, moreover, a pleasure to acknowledge that the advance nearest in importance to this, the getting of American mills to put in a cost system, was also largely aided by the initiative and pushing qualities of the H. E. Fletcher, who suggested to President Moore the formation of this Technical Division of the American Paper and Pulp Association. The American paper and pulp industry owes Mr. Fletcher a vote of thanks for his work in making it possible for the members interested in the technical work of the mills to come together in this way for the discussion of common problems.

It has often been said "that there is active and substantial co-operation in every interest which in any manner touches the production and consumption of paper, except among the manufacturers themselves. The formation of this division promises more toward a change from the condition given in the quotation I have just read, if it is a true statement, than any other step that could be made. Men engaged in the production and scientific phases of mill work have much to gain and at no injury to the mills they represent, by attendance and discussion at such meetings.

Suggestions Regarding the Scope of the Division.

Some subjects which it seems to me should early be taken up are the following:

1—The paper manufacturer needs to be able to tell from a sample of a pound or less of pulp, what kind of a paper it will make, or whether in a given furnish, it will serve to give the desired standard quality of paper.

2—Standard definitions for the different grades of bleached and unbleached pulp.

Perhaps with this should go a standard or definition of excessive bleaching, as the evil effects of over-bleaching on the paper are but rarely fully appreciated by the pulpmaker.

3—It is probable that a different unit in purchasing pulpwood would be to the mutual advantage of the woodowner and pulp mill. Certainly the mill should buy the wood for the pulp it will make, and the cord of 128 cubic ft. does not measure that at all accurately. The cellulose content varies much with the quality of the wood, especially if calculated on the yield per volume cord of 128 cu. ft.; e.g., sound spruce and balsam fir vary in yield from 16 to 24 per cent.

Twenty-five years ago, wood 8ft. to 18ft. in diameter cost $3 a cord at the mill; now, the actual content of the cord is less in that often half the wood will not be over 3 ft. in diameter. Then there was no need for accurate measurement of the wood; to-day, wood is expensive and accuracy is needed.

4—A discussion of the uses of byproducts. The mill dividends appear to be in the future largely linked with the use made of byproducts.

An American School of Paper Making.

The Paper and Pulp School of the University of Maine, which I have the honor to represent, is interested in the same problems as this division, and to you it sends its greetings.

We are attempting to give the young men the basic training for pulp and paper work, but we must look to you to give the opportunity for practical mill experience. Last summer, fifteen of the young men studying at Orono, worked in paper and pulp mills and received experience of the most valuable character. They worked where they were told, more as hands in the beater room than anywhere else.

That the mills found the young men fully earned their $50 a month and were worth while, was indicated in several ways, **e. g.,** half the superintendents asked the young men to write to them with regard to a regular job, after graduation. Next summer, we will want to place twenty-five young men in the mills from June 15 to Sept. 1. I hope you, who are here present will aid in giving these young men an opportunity for practical experience the coming summer.

A Library of Paper Making Chemistry and Engineering.

One of the needs of the industry in America is a library containing a practically complete collection of books and periodicals on paper and pulp, the volumes of which will be available for loan to those in the industry anywhere in the country who have need for information on these lines.

The University of Maine has now about half completed such a library, but as yet has no facilities for loaning of the books or the completion of the files. It is hoped that arrangements may be made with the American Pulp and Paper Association making such a loan possibility a reality and permitting the completion of the list of books and technical periodicals.

A little later it is the intention of the Paper and Pulp School of the University of Maine to issue bulletins on production, control and analytical methods of use to paper and pulp mills, and bibliographies on special subjects of interest to men working in the industry. It is my intention to see that each of you shall receive copies of these as issued and I trust you will find them of interest.

Professor McKee's address was delivered at a meeting of the Technical Division of the American Plup & Paper Association held in the Waldorf-Astoria Hotel, New York City, on February 19th.

Henry E. Fletcher of the Fletcher Paper Company, Alpena, Michigan, was elected to the Chair and introduced the subject of the inauguration of a Technical Section in words which will be of great interest to the readers of the Pulp & Paper Magazine. He said:

"Gentlemen, in talking this matter over this morning with a few people from out in the West, we thought it would be a good thing to get some medium of exchange for technical ideas, and bring the entire divisions together, such as our machine design work. No matter what the division is, we practically use the same thing. The machine design work, I think we will all agree, is pretty crude in many ways. As in other things there is a chance of machinery builders learning the troubles of other machines through the travelling salesmen mostly, not entirely so, but mostly through the travelling sales force, as to complaints that are coming in. If we have some concentrated work on that subject to collect data on, I think there would be a great many improvements develop in those lines. Then there comes another proposition, such as crude wood, taking up yellow stains and chipping, and everything that comes along with that in the chemistry line, which would come right along with the work of our official chemist, Professor McKee. Then we get into the subject of wires and felts, and the sales member tried to get some way to get uniform costs.

We had a very nice meeting here two years ago last December. We had about thirty. Some of you gentlemen here were present. On the cost of work, and I think it had a lot of good results, followed later by a meeting in Chicago, which seemed to wake the bunch up. Now we can give consideration to the ideas as at the manner or organizing. I think myself, that we would have to have more or less sectional meetings, collecting our data together through the official chemist, and through some medium, such as "Paper" or some of the magazines. I think before we go ahead in organization, Professor McKee has had a good deal of work along this line, furnishing the University of Maine, and in his official report to-day, I think he has taken the subject up."

The organization of the Association was finally left to a committee of five, appointed by the Chairman after consulting with President Moore. It is expected that this committee will meet in the near future and discuss the best plans for getting the Association under way.

Professor McKee urged that it would be well to push along and secure strong organization within two or three months time. He said further:—"My thought is, that the organization should be perfected very soon; that the meetings which have been suggested here at the different places (i. e. for example, Holyoke, Buffalo and Chicago) should be held, but it may be wise to hold those on other particular subjects. That is, take up the question, for example, of standards for wheat pulp, or the question of making paper from pulp, which is a problem which is troubling the paper manufacturers very much at present. That is, to limit in a way a particular meeting to two or three subjects, and have it, not as to a series of addresses, but as a discussion started up by people appointed for each subject, and follow it up by others on the subject in hand. Then there can be, and should be after an organization is made, opportunities which would be made use of, of what might be called technical bulletin. Just for illustration, at present, the dye situation is a pretty hard proposition for the paper manufacturer, but is very likely to be a much harder proposition a few months hence, particularly along certain lines, and, as to what can be done there, and other things which cannot be done. I happen to have some inquiries from people who wanted to know about particular dyes that their dyes are up. They can buy under one name, if the dye is made by American firms. Under other names,in one of the cases, they succeeded in getting it, but it was from lack of knowledge as to their trade names for the same dye. Practically the business depends on that largely. Then other things may come up which are just as important, and can be gotten at by a committee or the Secretary, which will be of much interest to the technical men of the country."

At this meeting there were two interesting addresses, one by Mr. Arthur B. Farr on "The Application of Ball Bearings on Paper Making Machines" and by Mr. C. E. Ripley on "Heating, Light and Power in Paper Mills."

AMERICA'S PULP AND PAPER SCHOOL

A New Branch of Education Successfully Launched at the University of Maine

By J. NEWELL STEPHENSON, M.S.
Instructor in Papermaking.

A little more than two years ago the authorities at the University of Maine awoke to the fact that a large number of Maine men were entering the pulp and paper industry. This industry in this country had begun to suffer from the lack of scientifically trained men to promote to positions of technical importance. The men now or lately in positions of authority have learned all they know by hard experience and have spent long years in the tutelage of this expensive teacher. All our industries are engaging more college graduates every year. Much is expected of them, sometimes too much, as it takes some time for a person to adjust himself to [illegible], a civil engineer to a drafting room or work on a bridge, a chemist to analytical work in a laboratory, but there is nothing in a university course that will help a man to feel at home with a beater [illegible].

The Pulp and Paper School is a part of the work of the Chemical Engineering Department. Its purpose is to give a man a sound training in the fundamentals of chemistry and engineering and as much of a greater balance will permit of subjects distinctly cultural, linked with such training in the manufacture of pulp and paper as he can not readily get in the mill. The student can thus shorten his apprenticeship if he is to have a position in the mill or he can learn much about the making and properties of paper and pulp and their raw materials if he is to work at the office end or laboratory, or in a warehouse or print shop.

Most of our paper comes from the forests, largely from the forests of Maine; thus this university is a particularly appropriate place for such work to be given. On completion of the prescribed four years' work at the University the student receives the bachelor of science degree.

Aubert Hall

Most of the work in the pulp and paper curriculum is done in Aubert Hall, the home of the department of chemistry. This new [illegible] fireproof building has three classrooms accommodating [illegible] students, a small lecture room seating [illegible] and large lecture room seating [illegible] and provided with an excellent projecting lantern. Besides laboratories [illegible] there are special laboratories for gas and fuel analysis, [illegible], physical chemistry, the manufacture of pulp, the making of paper and for paper testing. There are several offices, a repair shop, three balance rooms and a library and museum.

In the library are kept the books and periodicals relating entirely to chemistry, chemical engineering, and pulp and paper, including both American and foreign publications. The University Library is well supplied with books and journals of a general nature. The department is fortunate in the possession of a number of exhibits illustrating commercial products and their manufacture.

At present the paper mill contains a Noble & Wood beater of ten pounds dry weight capacity, a Packer screen fitted with plates donated by Wm. A. Hardy & Sons, a rotary bleach boiler holding about 10 lb of rags. This is used also for making soda cooks. The machinery is run from counter shafts driven by a 5 hp. General Electric 3-phase motor. The presses in the mechanical engineering laboratories, capable of 150,000 pounds pressure, are available when required.

For work in pulpmaking there are two small experimental digesters and one of semicommercial size that will hold about one and a half cords. An acid plant specially designed by Mr. Barker is ready to be installed and a Vesuvius sulphur burner is being built.

One of the greatest advantages that the school has for carrying on this work is the very cordial attitude and willingness to cooperate and assist on the part of many pulp and paper mills. Students not only make trips of inspection to the mills in the vicinity — and these represent nearly all kinds of pulp and paper manufacture — but are even permitted to do work as spare hands as a part of their instruction.

The school appreciates and acknowledges favors from many friends, including the mills, the Noble & Wood Machine and Iron Co., Sandy Hill Iron & Brass Works, General Electric Co., Mason Valve Co., Manhattan Ruber Mfg. Co., Wm. A. Hardy & Sons Co., A. Klipstein & Co., Heller & Merz, Cassella Color Co.; Badische Co., Portland Iron Works, A. Storrs & Bennet Co., Mr. Barker, Pusey & Jones Co., E. D. Jones & Sons Co., and Philadelphia Quartz Co.

A paper-testing laboratory has been equipped with Schopper instruments for determining tensile strength, stretch, folding qualities, weight, etc., a Mullen tester and a Randall thickness guage, donated by the makers and agents, besides compound microscopes, a hygrometer, drying ovens, etc.

Chemistry and Chemical Engineering Subjects

About 3 per cent of the students' time is devoted to chemical subjects. A broad foundation for this study is laid in the freshman year, when a course in general chemistry is taken twice a week in the fall semester and three times in the spring. This is supplemented by four hours' work a week throughout the year in the chemical laboratory. The classroom course takes up the study of the principal elements and their compounds and the fundamental chemical laws and theories. In the laboratory the student gains further knowledge at first hand and a measure of skill in manipulation.

In the sophomore year ten hours a week in the fall semester are spent at qualitative analysis when the student learns and applies the fundamental principles for the separation and identification of the common elements and radicals. The methods studied make it a part of the student's work not only to find what substances are present in an unknown substance but also to be able to tell approximately the amount of each.

During the semester four hours a week are spent in the gas and fuel analysis laboratory. Here the student prepares and analyzes samples of coke and several kinds of coal, determining the percentage of moisture, volatile matter, fixed carbon, ash, sulphur, and the heating value. Practice is had in the use of several standard types of apparatus for the analysis of gas.

This laboratory is especially equipped for the work and has an adjoining balance room. A separate room is provided with two Parr and two Emerson bomb calorimeters. This course is also a preliminary to the work in quantitative analysis, which occupies ten hours a week in the spring semester. This laboratory will accommodate ninety students in three sections. It is provided with steam baths and drying closets, electric ovens, etc. The student studies the fundamental principles of gravimetric and volumetric analysis and makes analyses of simple compounds. He gains considerable training in method and manipulation and an understanding of the importance of care and accuracy.

A subject of great importance to the pulp or paper mill chemist is organic chemistry. This course consists of three classroom exercises a week during the spring semester of the sophomore year. A complementary laboratory course comes four hours a week. Classroom work takes up compounds of the aliphatic series, as petroleum products, alcohols, acids, cellulose and other carbohydrates, etc. This course is continued three hours a week in the fall semester of the junior year with study of the aromatic series, including benzol derivatives, dyestuffs, etc.

In the junior year, besides the organic chemistry there are several other chemistry courses. Lubrication is given in conjunction with the department of mechanical engineering. During half of the fall semester there is one lecture a week on friction, theory of lubrication, preparation and properties of lubricants, and methods of applying them. For the remainder of the semester there is one laboratory exercise a week in the chemical and mechanical examination and testing of lubricants. This includes tests for flash, fire and chill points, viscosity, coefficient of friction, acidity, saponification and iodine values, tests for adulterants, examination under the microscope, etc.

A course in physical chemistry of three hours a week in the fall semester and two hours in the spring is devoted to the study by lectures and recitations of some of the more important principles and methods in physical chemistry in its several forms. The spring semester work is accompanied by a laboratory course of six hours a week in physical chemical methods, which includes determination of molecular weights; rate of reaction and chemical equilibrium; potential and electromotive force; the study of solutions through their conductivity and other methods; calorimetry, and the use of the more important instruments, such as the refractometer, polariscope, and spectroscope. This work is carried on in the especially euipped laboratory of physical chemistry.

Water analysis, both sanitary and industrial, is a laboratory course of four hours a week in the spring semester, taking up methods of analyzing a water as to its fitness for particular purposes with a consideration of methods of treatment.

In the senior year the student devotes the greater part of his time to pulp and paper subjects. Chemistry, however, is not neglected. In the fall semester industrial chemistry comes twice a week. This is a study of mechanical appliances and operations and the processes of chemical industries, including the moving of materials, filtering, evaporation, distillation, etc., also fuels and water for industrial purposes. A continuation of this course may be elected in the spring semester, taking up in some detail the more important chemical industries. As part of this course the class makes a trip of inspection to manufacturing plants of a chemical nature in New England, such as glass, rubber, gas and coke, foodstuffs, cold storage, sugar, etc.

In the spring semester one hour a week is given up to a course in chemical literature. This has two objects: To acquaint the student with chemical books and periodicals in English, German, French and with a method of search for information desired, and to give some practice in speaking to a critical audience.

The chemist's thesis may be and should be something for him to be proud of. He spends at least ten hours a week in the spring semester on this work, which takes the form of original research. As an example of what might be undertaken one student is making a thorough investigation, chemical and mechanical, of filter papers.

Paper and Pulp Courses.

Rapid progress has been made in the development of subjects relating directly to pulp and paper. Two years ago there was one course, now there are ten. The first of these is paper mill machinery, a classroom course of two semester hours in the spring of the sophomore year. A little more than half the time will be devoted to the study of simple mechanism, as types of motion, velocity, levers, cams, gears, belts, etc. With this foundation, the machines common to the manufacture of various kinds of paper will be analyzed. Attention will also be paid to prime movers, rope and the same time the function of these machines, as applied to the making of paper, will be explained. Some belt drives, arrangement of mill, etc. This course is preparatory to that in papermaking, a lecture course of two hours a week in the fall semester of the junior year. The topics include the history of paper, characteristics and reactions of cellulose, the processes of manufacture, as sorting, dusting, boiling and bleaching rags, beating, sizing, coloring, loading, and making of paper and boards, coating, finishing, special papers, sizes, and weights.

The corresponding laboratory course in the manufacture of paper comes six hours a week during the spring semester. Here the students make paper on the hand molds from a variety of furnishes, as straight rag or sulphite papers and mixtures, using ground wood, soda, sulphite, and rags. Papers are made with and without sizing, as for blotting, also with and without loading, etc. Rags dusted and cut are obtained from a neighboring paper mill, where the handmade sheets are finished. One of the present needs of the school is a small calender or plater.

The rags are boiled in the rotary, washed and bleached in the beater, which has a washing cylinder, and run into drainers when needed. The beater is furnished according to the kind of paper to be made and run into a stuff chest. From here it is carried to the two plate diaphragm screen, diluted and screened, then run into the dipping vats as required. The student thus obtains some knowledge of machinery and its operation.

The making of paper pulp is a laboratory course in pulp mill chemistry. Students must have completed the course in quantitative analysis as a prerequisite. The work taken up is that the ordinary falling to the chemist of a pulp mill of the soda, sulphite, or sulpate type, as the analysis of sulphur, bleaching powder, pyrite, cinder, spent liquor, etc. making and testing "acid" and making experimental cooks. For making these cooks the equipment will include a small sulphur burner, acid tower, and several digesters, a rotary iron digester of about three cubic feet capacity and an upright sulphite digester holding more than a cord, besides two small gas-heated digesters. The chips are obtained from nearby pulp mills. As a part of this work, the students spend a few days as spare hands in some pulp mill. This course comes four hours a week in the fall semester of the junior year and is followed in the spring semester by a two-hour lecture course on the process of manufacturing paper pulp. The uses of pulp other than for the manufacture of paper will also be discussed. In connection with this course, trips of inspection are made to pulp mills in the vicinity making mechanical, sulphite, and soda pulp.

In the fall of the junior year there is also a course of four hours a week in the cellulose laboratory, in which the student makes a thorough study of the chemical character of cellulose and some of its more important reactions and compounds. Among these are the estimation of cellulose in wood bychlorination; action of sulphuric acid and nitric acid, of various solvents, nitrocellulose, etc.

In the senior year there are four laboratory courses. The bleaching of pulp is taken up six hours a week for half of the fall semester. A study is made of the subject of bleaching from the point of consumption of bleach, color produced, etc. Curves are drawn showing rate of consumption, and the effects of such factors as temperature and concentration are studied.

Paper coloring takes the same amount of time as the bleaching of pulp. The student studies the subject of mordants, matches colors, determines the comparative strength of dyestuffs, tests retention, color of back water, etc., and learns to appreciate the effect of varying a complex color formula. From laboratory tests the student also calculates the amount of color for a basis of 1,000 pounds of paper. Experimental runs are made in the beater.

Paper problems is a laboratory course of twelve hours a week, taking the place of bleaching and coloring for the last half of the fall semester. A study is made of some phase of selected processes of paper manufacture, as cooking, beating, sizing, loading, coatings, etc.

Paper testing takes up three hours a week during the spring semester. The schedule this year includes the following tests: Strength and stretch and calculation of breaking length (using Schopper tensile strength tester and his "rapid" tester); bursting strain and calculation of "specific bursting strain" (using Mullen tester; thickness and weight (micrometer guage and quadrant scale); folding quality (Schopper instrument); resistance to penetration of ink; test for arsenic, free acid, moisture, ash, etc.; estimation of kind and amount of fibers present (using compound microscope).

Summer Work

As a part of this work the student in pulp and paper technology is expected to spend at least one vacation before graduation in a pulp or paper mill. This opportunity has proven of great value to the students who have invariably learned much of practical worth and have returned to college with a greater earnestness of purpose. On the other hand the services of these men have been appreciated by the mills where they have worked, and several students have practically pledged themselves to return to the mill after graduation.

The department of chemistry has arranged for these summer positions, the student being usually paid at the rate of $50 a month by the mill employing him during the summer.

Engineering Subjects.

Under this head we may include mathematics and drawing, both of which are introduced in the freshman year. Algebra and trigonometry are studied five times a week in the fall semester and analytical geometry five times a week in the spring. In drawing the student spends six hours a week throughout the year. This includes instruction and practice in technical freehand drawing and lettering, in the care and use of drawing instruments, and the study of orthographic, isometric, and oblique projection as a basis for instruction and practice in the making and interpretation of working drawings and tracings.

In the fall semester of the sophomore year there are three recitations a week in calculus. This course is arranged especially for the needs of students in chemical engineering and takes up the principles of differentiation and integration.

A course in mechanics is given in the fall semester of the junior year, three recitations a week. This is an elementary course in the fundamental principles of statics, kinematics, and kinetics, with applications to practical problems, as friction, transmitting power of belts, stresses and strains of bodies subject to tension, compression and shearing, as beams and columns.

Foundations is also given in the fall semester of the junior year. This is a lecture course of one hour a week on building stones; mortar; concrete, plain and reinforced; manufacture and tests of cement; foundations; caissons.

In the spring semester of the junior year, the student takes a course of two hours a week in direct current machinery which deals with the fundamental electrical principles and their application to the production, distribution, and utilization of power from the standpoint of a mechanical engineer. As a continuation of this subject a course of two semester hours in alternating currents is given in the senior year, fall semester. The fundamental elements of alternating current measurements and calculations are studied; also the operation of alternating current generators and motors and polyphase apparatus is treated from the operating engineer's point of view. This work is accompanied by four hours a week in electrical engineering laboratory where practical application is made of the work taken up in the classroom, as the making of electrical measurements and the operating and testing of various types of electrical apparatus. An important feature is the writing up of reports.

The student's senior year is largely occupied with engineering subjects. Besides the electrical work mentioned he studies hydraulics and heat engineering. The former is a course of two hours a week in the fall semester on the essentials of the subject, including fundamental data, hydrostatics, theoretical hydraulics, instruments and measurements, theoretical and actual flow through orifices, weirs, tubes, pipes and conduits, dynamic pressure of water. This is followed in the spring semester by a course in hydraulic machinery which should be of practical value to mill men. Three recitations a week for half of the semester deal with hydraulic turbines, waterwheels, and other features of hydraulic power plant development.

Heat engineering is given three hours a week throughout the year. This course has to do with fundamental theories of gases and steam, illustrated by problems practical in form; the laws of thermodynamics; laws of gases; characteristic equations for gases; kinds of expansion and compression; Carnot's cycle; heat quantities in steam; use of steam tables; quality of steam; calorimeters; entropy. The second semester's work includes types and details of steam boilers, engines, and auxiliary machinery; a consideration of fuels and the chemistry of combustion; efficiency factors of the steam-boiler plant; heat losses of steam engines; compound steam engines; refrigeration; gas engine cycles and gas producer principles.

General Studies.

The department of forestry offers courses of fundamental importance to the pulp man, including as required work one semester hour (one hour per week for a semester of eighteen weeks) of classroom work in forest products other than lumber, as distillation products, dyewoods, charcoal, pulp, etc., and two semester hours in general forestry, a broad study of the subject, taking up the geographic distribution of forests, the relation of forests to health, to government, to floods, etc. Other courses may be elected, and the summer forestry school offers a unique opportunity of getting first-hand knowledge of the great woods.

Biology is closely associated with forestry. The course in wood identification gives the student thirty-six hours in the laboratory for the preparation of sections of typical woods and their examination and identification under the microscope. If the student has time, much interesting and valuable work may be elected in this department.

In the department of physics two courses are required. General physics takes five semester hours of classroom work one semester, and three the next. This work consists of lectures and recitations on the dynamics of solids, liquids and gases, sound and light, heat and electricity; experiments before the class; problems. This course is accompanied in the second semester by five hours' work in laboratory physics.

Proficiency in foreign languages is thought of by some as a "college frill," but the error of this attitude becomes evident when we consider the fact that a large part of the most valuable scientific writing is in German. A considerable amount is in French. Much of value is translated, but not very promptly as a rule. Often the apparently insignificant article not translated is very important for a particular purpose. It is thus necessary for the technical man to keep in touch with what is being done by many workers who write in a foreign language, especially German. This work forms a very important part in the education of the technical man, particularly if he is interested in pulp and paper. For this reason the student in pulp and paper takes a course of two semester hours for one year in elementary German, grammar, composition and easy reading, and a course of two semester hours in scientific German, reading scientific German and studying the vocabulary and construction of this kind of material. If the student has had a good high school course in German, elementary French is taken five times a week throughout the freshman year, otherwise German is begun at this time.

Even more important than a knowledge of a foreign language is the ability to write and speak in clear, concise, correct English. To this end three exercises a week during the freshman year are given to the study of English rhetoric and composition. The work is especially planned to meet the needs of the technical student. During the sophomore year there is one exercise a week in public speaking, the writing and delivery of speeches, assuming the audience to be a board of aldermen, scientific society, business organization, etc. To semester hours in the senior year are given to the study of business English, as correspondence, mechanical details, reports, preparation of manuscript for technical journals, etc.

Business law, three semester hours in the senior year, has the purpose of acquainting the student with those legal principles and practices which are essential to a business life and with which every citizen should be familiar.

Elective and Required Subjects.

The Student specializing in pulp and paper technology has the privilege of choosing five semester hours in elective studies in such subjects as he is fitted to pursue. Among these he may select courses in forestry, biology, physics, economics, English, psychology, etc.; chemical studies, as metallurgy, electrochemistry, mineralogy, chemical calculations, special laboratory work, etc. engineering studies, as factory organi- mechanical laboratory and strength of materials laboratory, shop work, etc.

Two courses are required of all students. Military training and tactics is required by the Federal Government and is in charge of an officer of the regular army, who is detailed to this post by the President of the United States. Three exercises a week of instruction, drill, and rifle practice are given each week throughout the freshman and sophomore years.

To counteract the tendency on the part of many students to confine themselves too closely to their studies, thereby endangering their health, the university requires each student to take three hours' exercise a week in physical training during the freshman year.

Many students come to the University of Maine in preference to other institutions of equally high standing because of the moderate expenses at Maine and other advantages of the location. The university is in the town of Orono, which is eight miles from Bangor, a city of more than 25,000 population. There are many oportunities for pletsant outdoor recreation. The campus covers some 30 acres and already has more than twenty-five buildings, with several in project. The student body numbers nearly 1,200.

Board and room in the men's dormitory costs on the average $170, textbooks $10 to $30, laboratory fees $10 to $25, tuition and other fees $60 for residents of Maine: for students from without the State the last item is $100, as the tuition for these men is higher.

SOME ASPECTS OF TECHNICAL EDUCATION

Address of Dr. J. W. ROBERTSON, Chairman of the Royal Commission on Industrial Training, and Technical Education, before the Technical Section of the Canadian Pulp and Paper Association.

Dr. J. W. Robertson, in the course of his remarks, said:—

In all the activity of our ten fingers, knowledge of the brain is required. The making of capital comes from the use of the ten fingers. Manual training is not a new thing—it has been clearly known for a very long time, and it is the result of the activity of the brain. The brain is our daily weapon—a scientific instrument.

In starting I want to say these things to you: If you are considering any plan or measure at all it is well to get the clear facts of the thing at first and you can do it—otherwise, you will accomplish little. Therefore, then, have your thoughts concentrated well upon what you are doing. Now, on education—for all time [illegible] for our business and all [illegible] point out these simple things to you. In the people themselves certain results may be looked for—knowledge, for instance. Think you how this comes. It does not come from [illegible] people tell you but by experience gained [illegible]. Then there is practical ability to put that knowledge to use [illegible]. All [illegible] from knowledge [illegible] experience and good education. Of course [illegible] of good will [illegible] fied at the head of good will.

Technical knowledge [illegible] in the pulp and paper business [illegible] men wealthy, certain machines valuable and marks success, generally, gained by knowledge. We may find inexperience in one of certain ability, acting by destroying education and practical ability. It is a question of knowledge on the one hand and experience on the other—one goes to put out the other. His job is too big for him—not that he is unwilling at all, but he has not been working upon fact, admittedly, and though his purpose may seem worthy, he finally discovers that business is business. His purpose defeats itself. He is a victim of habit—not an originator. What does it mean? It means that men shall produce everything and be valuable for what we will get from them. It may well be said a man has no business on this earth who can do nothing but collect things that [illegible]

It is the business of men to progress and live better. We all [illegible] not by learning to get better things, but by learning to [illegible] the world richer than it was. The other fellow is not now depended so much upon. I do [illegible]

[illegible]

pression they get either by speaking or writing, and it helps to make it stronger and they are thus enabled to use it in the right way. Every child likes books but if they do not get the ideas properly imprinted upon their minds they cannot give expression to these theories.

Manual training is not new in this country. The world for Canadians, I say, instead of Canada for Canadians. I am in the habit of saying things I mean. We want to bring the biggest minds together to get things started. I brought 26 men from England myself for public work—later matters developed into something.

You have to think for all branches of the industrial training and education as it is for occupations of all kinds. The question of satisfaction the individual gives in his occupation—that follows after. We get our measure of service in securing satisfactory workers who get out their work and the chances given children to learn to work and help—that is the biggest idea—giving the child a life occupation. I never heard of a great man who never had followed one. By instilling capability into the body, it makes people feel they want to move—that our occupation is the making of things. You have the highest grade of workers to think of, every kind of information to think of. For instance, for the men who are to become engineers in the pulp and paper making industry—in placing bright individuals where universities can do something. In Canada we have done a great deal in that respect. Why cannot we get more service than we get now from men who are engineers—who have been up against the actual problems and who will gather more out of it if they get it now in three months than they could before in three years?

Get the information from the people, then write the secretary and get a copy of the Reports from the Department of Labor—put it in practice. It is all ready there, legible to anybody, and is only a matter of conscientious application. See it crystallize. Get the things expressed, then get them put in operation. Talk with men, teachers and associates; convince yourselves now, you coming from the farms, high schools, business colleges, of what you are going to speak about if you are to advise, to teach that to others. You have books out of which you can get all this information.

The middle grade of workers are not provided for in training. For example, take the foremen, he is under the superintendent. Foremen in many businesses are not necessary men who were employed in the past. Now this is not the way of doing things. It is the man who can drive men the hardest and get the most out of them. That is the trouble—it is like that, and it is pitiable. But wages are in the balance. If he had the right education he would not drive men. He would have something in him besides business. Anyone who is a worker—who is a wholesome man, if he attends to his business in such a way as to give satisfaction, is not a shirker.

You get most good by organization. Take men taking correspondence courses: In many places they have visits from instructors as well as the correspondence course. By the minutes of the Scranton School of Correspondence 85 per cent of the men who take it up never finish the course. In Wisconsin instructors go around and hardly 10 per cent of the men drop it. The personal talks keep the men going on. This is well worth providing for. You get up a short course in the mills to capable men—a short conference of four days, visit the mill, ask the foremen and have a conference and ask others to talk it over. I would send my men to such a conference if I owned a mill. You will get more good out of your men. Suppose other men take him away, you can get just as good men elsewhere, because these instructors tell other foremen about these things. You have a grade of workers called "experienced"—they don't need any education—I don't agree with that. We in Canada must plan our affairs so that no man makes a profit by getting it at the expense of labor. He who employs men and obligates them shows he is a degraded jobber.

If these men could have a night class and picture shows depicting all the waste in profits and prices of materials here conversely with materials in other countries you would be amazed the way they would talk about it. In corporations, in that way you would get much out of the men from talking with them upon the best agreed courses.

To sum the whole thing up, we will say this is practically a new business, not more than 25 years old. Your servants, of course, have to be promoted. You have made much of raw materials, you have a class of true men who have gone through with the course, and have knowledge in the use of machinery. You can observe that the present jobber is not raw material.

I thank you, gentlemen, for your close attention to my remarks.

ESTIMATE OF THE FOREST WEALTH OF THE PROVINCE OF QUEBEC.

According to an official estimate, the forests of the province of Quebec contain approximately the following:—

50 billion feet, board measure, of white and red pine, worth	$200,000,000
125 billion feet, board measure, of spruce and balsam fir, worth	250,000,000
100 billion feet, board measure, of pulpwood, worth	100,000,000
35 billion feet, board measure, of hard wood, birch, maple, etc., worth . .	25,000,000
20 billion feet, board measure, of cedar, worth	25,000,000
	$600,000,000

TRADE INQUIRIES

The following trade inquiries have been received by the Department of Trade and Commerce, Ottawa.

206. **Paper, parchment.**—A firm in Natal, South Africa, desires to obtain parchment (size of sheet 21¼ x 33, 500 sheets to ream, 36 pounds to ream) and brown wrapping paper. Samples are requested.

299. **Roofing material.** — A Cape Town firm requests correspondence with view to agency in roofing material.

329. **Pulp and paper.**—A gentleman in France desires to get in touch with Canadian pulp mills with a view to placing their products in France. He would also like to get in touch with large paper factories dealing exclusively in: (1) the newspaper article, finished and pressed, in reams and rolls (news print); (2) commercial envelopes, official and commercial size; (3) all ordinary white papers, coloured, having in stock considerable quantities in a position to reply to all requests by return mail.

THORNE'S RECLAIMING SYSTEM

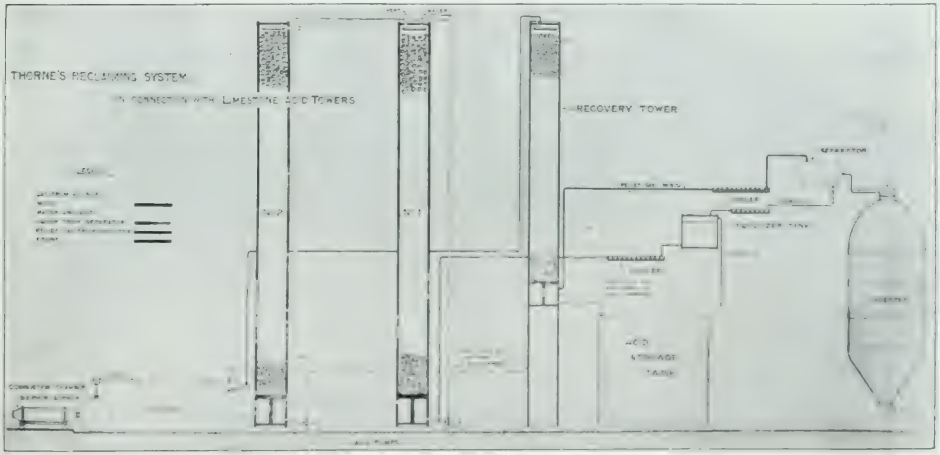
Paper Read by Mr. C. B. THORNE, Riordon Pulp and Paper Company, Hawkesbury, Ont., before Technical Section of Canadian Pulp and Paper Association.

The Paper Maker says that News is made on the grinder stone: we may, with the same right, say that sulphite pulp is made in the acid plant. The quality of pulp we produce depends on the acid we are using.

It has been difficult to produce an acid with a high percentage of Free $S.O_2$, and at the same time carry a low amount of lime. From the usual milk of lime system, or the tower system, we will find that to get an acid with 4 to 4.5 p. c. total $S.O_2$, it is necessary to run a 1.5 to 2.30 p. c. combine. Especially in the summer time, when the water is 20 deg. to 30 deg. C., the amount of lime will come high.

This high percentage of combine is a waste of money, as it is an unnecessary ballast in the digester.

A combined $S.O_2$ of .9 to 1.1 per cent is all that is needed to neutralize the acid formed in the digester; but many mills have to run a high combine, so as to be able to get up the strength of the acid.


THORNE'S RECLAIMING SYSTEM
IN CONNECTION WITH LIMESTONE ACID TOWERS
RECOVERY TOWER
SEPARATOR
ACID STORAGE TANK

Thorne's Reclaiming System in Connection with Limestone acid Towers.

This extra combine is a waste of money and gives us difficulties in manufacturing, as it plugs up the piping and drain holes in the pit.

Good cooking acid to-day should have an analysis of:

5.5 Total.
4.5 Free
1 per cent Combine
.84 Lime

If we can produce this acid we will find it of great advantage. It will:

1.—Increase efficiency of the sulphur so we will use less, and come down to between 180 to 200 pounds per ton pulp—depending on the quality of fibre wanted, and the kind of wood used.

2.—We also save sulphur because we are carrying less combine.

3.—This high acid will give us a better quality of pulp, as it penetrates the chips and knots better and quicker—it also gives us a more evenly cooked fibre.

4.—As we are using a high percentage of Free $S.O_2$, we get a whiter color.

5.—The fibre will also be cleaner, because the strong acid will dissolve and bleach the dirt.

6.—The output of the wood increases, as we are cooking a more even pulp—and the screenings are reduced from 5 to 8 per cent, down to less than 1 per cent.

7.—The high acid has the advantage of dissolving the fibre without running the temperature of the digester up to the usual height, thereby saving coal.

8.—As the amount of lignin left in the fibre is less, we will save bleach.

9.—And, as the dirt is decreased, we will save coal in the bleaching beater, as we don't need to run the temperature up so high.

10.—High acid also allows us to cook faster, if desired.

It has been impossible, however, to make this high percentage of Free $S.O_2$ without carrying a high combine. It has been especially difficult in Canada and United States on account of using wet wood.

To increase the free in the acid we have a splendid help with the gases we relieve from the digesters, and up to now these gases have been absorbed in acid storage tanks with false bottoms—the gases being let below the false bottom, and the gas bubbles have been more or less absorbed by passing through the acid.

Some mills use a separator—separating the gas and the liquor. In that case they absorb the gases in the storage tank, and send the separated liquor to the sewer.

An acid storage tank is, however, a very poor absorbing apparatus. If the acid reaches a certain strength and temperature, it will not absorb any further gas, and if we tried to throw more gas into the tank it would only stir up the acid—make it foam, and the gas would escape instead of being absorbed.

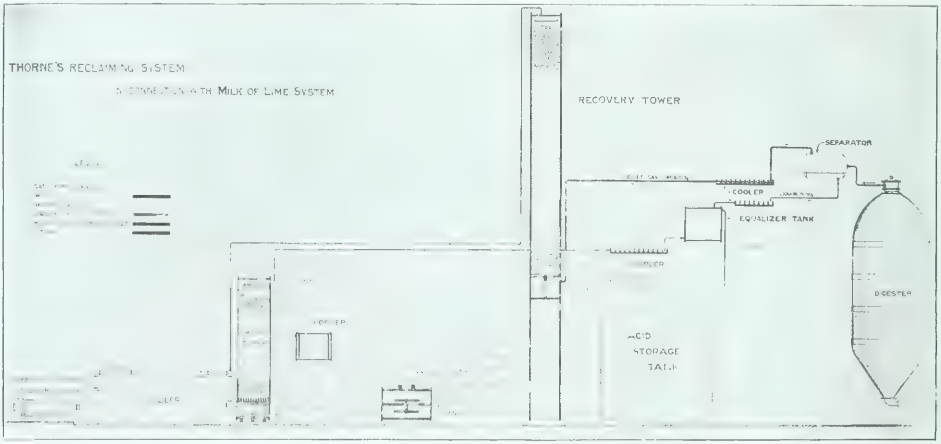
I shall now describe the system which I have been using for years at the Riordon Pulp and Paper Co.

This system is now in operation in 16 mills, and sold to 25 mills, with a production of more than 2,000 tons a day.

The system allows us to get an acid which has the strength required: The drawing here shows us the way it is arranged with the Tower System.

The sulphur is burned as usual—here I have indicated the Rotary Burner. The gas passes through the combustion chamber to the cooler—from the cooler it is drawn through a fan—this fan pressing it into the tower.

The gas will pass up through the limestone in this tower, and will be absorbed by the water coming down from the top. Any gas not absorbed in this No. 2 Tower will go through a pipe to the next Tower, No. 1, and here the gas will meet the water coming from the top, which will absorb all the rest of the gas.



Thorne's Reclaiming System in Connection with Milk of Lime System.

The carbonic acid formed, as well as some oxygen and nitrogen will pass through the Vent Pipe.

The water will, first pass through Tower No. 1—later through No. 2 Tower; when it leaves Tower 2 it has a strength of about 2.60 Total; 1.60 Free; 1 per cent Combine.

By running these low totals through the towers, we keep the combine down, and we get a higher capacity on the tower.

We have now to look at the way the gases from the digester will be utilized:

After it is relieved from the digester, it will pass through a separator. In this the gas will be separated from the spent liquor.

The gas leaving the top of the separator has about 98 per cent $S.O_2$, it passes through a cooler down to the bottom of the recovery tower.

The spent liquor contains about 1 per cent $S.O_2$ as an average.

From the separator, the spent liquor is passed through a cooler—from this cooler to an equalizer tank. From this equalizer tank it runs a steady stream of liquor through a second cooler—and from here down to the pump.

In the suction pipe on this pump it is mixed with the acid from No. 1 tower—and is pumped over to No. 2 tower.

In No. 2 tower the spent liquor is strengthened by working down through the tower, and it reaches a strength of 2.6 Total.

The acid from No. 2 tower will be pumped to the top of the recovery tower, and fall down and meet the gas from the separator.

The recovery tower is filled with wooden blocks to form a large surface.

The absorption will be done very rapidly. We let in an acid with 2.6 per cent total at the top and same is strengthened to an average of 5.5 per cent total in the bottom.

From the recovery tower this acid is, in the usual way, let into the storage tank.

Any gas that is not absorbed in this tower is drawn from the top of the tower, through a vent pipe, down to the gas from the cooler—it will thereby always be utilized.

The relief from the digester is very uneven, therefore, the acid in this tower will have to absorb an enormous amount of gas, and the strength may go up to above 7 per cent total—but as an average we will get about 5.5 per cent.

The same separator—coolers—equalizing tanks—and recovery tower will be used for as many digesters as wanted.

The spent liquor, which in most cases has been thrown away, is utilized in a very effective way, as same will not weaken the acid, but will pass through the tower system, and be strengthened.

With this reclaiming system we are able to get a recovery of 100 per cent, and then we are strengthening an acid from 2.60 Total to 5.50 Total.

I have found another advantage with this system—i.e., it is possible to make an acid with 5.50 Total, and keep a temperature up to 35 deg. C., without losing the gas.—The gases from the separator have a temperature of about 60 deg. C., and the acid from the top of the tower has a temperature of about 20 deg. C.

As the acid is falling down through the tower, it is gradually heated up, and the gases are gradually cooled off, as they go up through the tower; thereby the acid on its way down the tower will absorb the heat of the gas, and at the same time the gases will cool off so that the acid can absorb all the gas.

It is impossible to get an acid heated to 30 deg. to 35 deg. in an acid tank as the bubbles that the gas would form would stir up the acid too much, and gas would, at that heat, leave the acid.

Milk of Lime Arrangement.

This recovery system is well adapted for milk of lime system, and I am here showing the arrangement which is used in many mills. It was first installed at the J. & J. Rogers' sulphite mill in Ausable Forks, N.Y.

You will see that the gas from the coolers is first passed through an acid tower—from the acid tower to the milk of lime system. Only one continuously absorbing tank is used.

From the milk of lime system the gas is sucked out through a regular vacuum pump.

The lime water is let in through the absorbing tank in the usual way. It is let from the tank into a centrifugal pump—from here through a cooler up to the top of the acid tower.

You will notice that the spent liquor is added to the tower as shown on the drawing.

At the bottom of this tower we get an acid of about 2.60, and this is pumped, by a centrifugal pump, up to the top of the recovery tower where it is strengthened to a total of 5.5.

Newfoundland Notes

Weather conditions during the month of January were ideal for lumbering operations, but the month of February from the beginning till the middle was one unintermittant duration of mild weather. All companies operating, however, have very large cuts to their credit though the season's total output will not equal last year's, the number of loggers working being considerably less than last year.

Cutting pit props [illegible] considerable than logging, and quite a few who [illegible] always spent the winter in the lumber woods have remained in their own neighborhood cutting pit wood. Several English contracts have been placed here for amounts varying from twenty to one hundred thousand cords. The price paid by the local man to the buyer generally ranges from two to two and one half dollars while the price paid in England will be six or seven dollars.

Shipments have been already made to English collieries. Some of these mining companies for which contracts are being filled have sent out representatives to supervise work here. From these we learn that the shipments of Newfoundland pit wood already in England have been subjected to the customary tests for adaptability for pit wood by the Board of Trade and found superior to the continental article. Our spruce shipments have been found perfect for such purposes, whilst the fir wood, though not so good, is quite as suitable as any thing brought hitherto from Spain and France.

[illegible] have regarded the prospect of establishing successful pit prop trade with [illegible] now have realized its wonderful possibility of development and are taking up the work on a vast scale.

An enactment of the legislature, however, debars shipment of pit wood from this colony later than the 30th of next June. Before the war the law forbade exportation of pit wood whatsoever, but the government for the mutual interests of English mining companies as well as our own people suspended the law for nine months. A move, however, fully representative of the peoples interest is now being promoted to petition the coming legislature to extend the license to cut props from one to five years, and there is every prospect of such a law being passed.

Due to an inadequate system of fire wardenship every year millions of feet of our best timber is touched by fire. This wood has been allowed to rot. This wood will be accepted for pit wood by any English colliery. Quite an industry could be created and profitably maintained if this commodity were permitted to be exported. An effort therefore is being made to petition for abolition of the statute relative to prohibiting this article from being marketed. Negotiations for the purchase of Newfoundland and Labrador timber limits are more active now than any time since the war broke out. English and French capitalists are mostly negotiating the conducting of preliminaries and supplying of reports, etc., is all done by Mr. B. M. McGrath, well known timber expert. English companies are seeking generally areas suitable for pit props, whilst French negotiators require lands with water powers, etc., suitable for erection of mills.

The Report, of the English Commission dispatched here last fall, has just been published, and speaks very favorably of the colonies timber resources, and expects it to supply henceforth a large part of the pit props annually required.

The United Empire Magazine, speaking editorially of Canada and Newfoundland, says: "They should amply suffice to meet any needs that may arise during the progress of the war."

Recent statistics go to prove that Newfoundland in the exportation of paper for the past year to England, our largest consumer, has created a record for herself. The total amount of reel paper imported last year into England from Newfoundland reached approximately one million cwt., whilst the amount for 1913 was about eight hundred thousand cwt., an increase of roughly two hundred thousand hundredweight; for the five months succeeding the outbreak of the war, the increase is most pronounced. It is gratifying to note that these shipments of reel paper are largely substituting the article which Germany always supplied, and there is, therefore, every prospect that we will have so completely ousted her paper-trade that the cessation of hostilities will not mean the collapse of the boom we are now enoying.

Never before in the history of lumbering were applicants so numerous for permission to use the water of the inland system for the purpose of driving saw mills. About twenty applications were made last week. Few, if any, of these applications have been made by companies, but mostly by private individuals, mostly residents of the colony.

The much disputed, and the still undecided line of demarkation between Canada and Newfoundland is spoken of as being submitted to a conference between Canadian and Newfoundland delegates next summer. The disputed area in question contains some of the greatest timber areas and water powers in the world. The Canadian Government confines Newfoundland territory to a few miles along the coast whilst Newfoundland claims much more.

THE RIVER DU LOUP PULP COMPANY LIMITED

The mills of this Company, which at present specializes in the manufacture of a high grade, all spruce ground wood pulp, are located at Fraserville, Quebec, — or, as the place is perhaps better known to the tourist, "Riviere du Loup, **en bas**", — a popular Summer resort of great scenic beauty on the south shore of the St. Lawrence, about a hundred miles below Quebec City, and almost directly opposite the mouth of the far-famed Saguenay.

The early operations of this company, which was established in 1901, were considerably hampered and impeded by the very erratic regimen of the River du Loup, or "Wolf River", on which stream their power development is located. By the creation of a system of Storage Reservoirs, however, on tributaries of the main stream, having a combined total storage capacity of around three billion cubic feet of water, they have overcome that difficulty, and now possess a controlled, dependable water power that enables them to operate at all seasons of the year, whether drouth prevails or not.

The power development consists of a rather low dam, at the head of a series of cascades and rapids, from above which leads off their power canal, 275 feet long, 35 feet wide, with an average depth of twenty feet, cut through the solid rock of a peninsula around which the river bends, and terminating in a concrete walled fore-bay, from which descends the twelve foot steel penstock by means of which a working head of seventy-five feet is obtained. At present, six pulp grinders are installed, direct connected to Smith-McCormick horizontal turbines of special design, and the normal daily capacity of the Mill is forty net air-dry tons per twenty-four hours.

An especially interesting feature of this installation is the manner in which the pulp is sheeted and made ready for shipment. Originally termed "NEW PROCESS" this name seems now rather inappropriate, considering that the product has been on the market as a commercial proposition for the past 12 years. The ordinary methods of grinding and screening are followed, quite as in other up-to-date mills, but after leaving the screens, the stock passes through a battery of concentrators, where it is reduced in volume to a consistency of about five to seven percent air-dry fibre, and pumped under a constant pressure of ten pounds through a circulating pipe connected with the machines which form it into sheets.

General View of plant of River du Loup Pulp Company, Fraserville, P.Q.

These machines, the "Warren-Hughes Patent Wet Machines" are not really "Wet Machines" in the commonly accepted meaning of the term, as they have neither press rolls, cylinders, nor felts. They consist essentially of a closed compression chamber, divided into four pulp spaces by means of movable drainage plates, connected with a heavy hydraulic cylinder actuating the platen, or follower head, which forms one end of the compression chamber and by means of which the pulp is compressed into sheets and the moisture extracted. At each pressing, four sheets of pulp are formed, twenty inches wide, twenty-six inches long, and about one-half inch thick.

In operation, the follower head being retracted and the door of the compression chamber closed, pulp is admitted to the spaces between the drainage plates through a manifold at the back connected with the circulating pipe to which reference has been made. These spaces being suitably filled, a large volume of water at low pressure is admitted to the hydraulic cylinder, rapidly advancing the follower head and compressing the pulp, the water from which flows off through the drainage plates and their connecting drain tubes. When the travel of the follower head is arrested, a small volume of water is admitted to the cylinder under high pressure, which completes the extraction of water from the pulp in so far as this may be accomplished by purely mechanical means.

When this terminal pressing is completed, the follower head is rapidly retracted by the same pressure

KENNETH L. WARREN,
River du Loup Pulp Co.
Mr. Warren is also Chairman of the Mechanical Pulp section of the Canadian Pulp and Paper Assn.

Grinder Room, River du Loup Pulp Company and volume which initiates its travel; the door rises, a false bottom drops, and the pressed sheets are extracted, to be placed in a baling press and bundled for shipment.

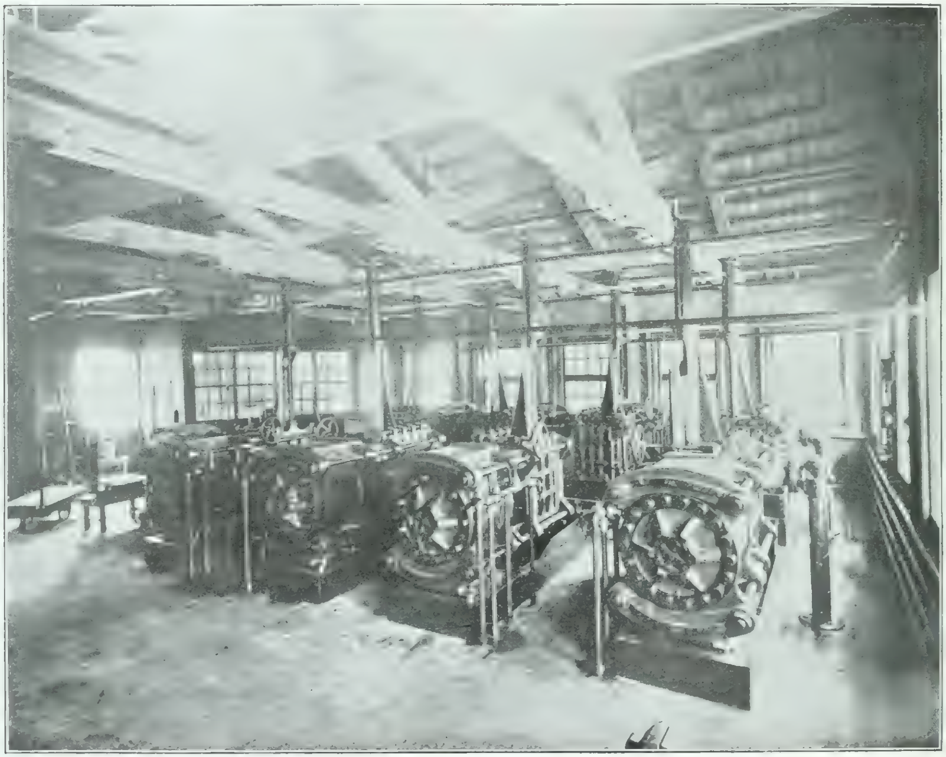
Each machine has a nominal capacity of five tons of fifty-one to fifty-two percent air-dry fibre per twenty-four hours. At a higher test, naturally, their capacity is somewhat less. Being arranged in batteries of four machines, under control of a single operator, the saving in labor is manifest, and when it is noted that the eight machines which this Company has installed occupy a space in their Press Room but twenty-six feet square, over all, the economy in floor space and corresponding low installation cost becomes evident.

According to Mr. K. L. Warren, who developed this process,and has been Manager of and Engineer for this Company since its formation, a direct saving in conversion cost of over $1.25 par eir dry ton can readily be demonstrated. Being operated entirely by hydraulic pressure, no disbursements are necessary for belting, machine felts or press and felt rolls; oil consumption is reduced to a minimum, and the power requirements are very low, not exceeding one-half horse power per air-dry ton of daily product. Practically the only operating disbursements are for piston rod and piston packing, and for the brass drainage plate covers,—these latter requiring to be renewed not oftener than once a year, unless accidentally damaged.

Another important feature of this process is its absolute prevention of fibre loss. The drainage plates are covered with finely perforated sheet brass, on which a thin film forms as soon as pulp is admitted to the compression chamber, precisely as on the cylinder of an ordinary wet machine, so that when pressure is applied, the water extracted is strained through the pulp itself, and the resulting waste water, being practically filtered, is entirely free from waste fibre in suspension.

Mr. Warren also states that pulp sheeted by this process is very permeable in texture and reduces rapidly to slush when properly furnished, thus effecting a considerable saving in the time and power required for beating. This is due to the fact that it absolutely lacks the sheet formation, or felting and interlacing of fibres caused by the operation of the ordinary wet machine. As the sheets are uniform in size and shape, they can be compressed into a compact, air-tight bundle that may be kept in storage an almost unlimited time without deteriorating in the slightest degree from atmospheric conditions, which can affect only the outside of the bundle.

The Company owns and operates extensive timber limits, which are traversed by tributaries of the river on which their Mill is located, and at a very short distance from their Mill site, so that with cheap pulp wood, a controlled river flowage assuring dependable water power, and good shipping facilities, they seem now to be entering on a period of well-deserved prosperity and success.


Compressors in River du Loup Company's plant.

WHO'S WHO IN THE CANADIAN PULP AND PAPER · INDUSTRY

F. A. RITCHIE, PRESIDENT, RITCHIE & RAMSAY, COATED PAPER MANUFACTURERS, TORONTO

"Made-in-Canada" is a slogan now heard far and wide. It is appearing in newspaper advertisements, business literature and on many kinds of merchandise, arousing Canadians to greater patriotism at the present time and stimulating interest in and appreciation of all lines of manufactured products. It is as familiar and popular in the Dominion as "Tipperary," the British soldier's marching song. There is no necessity to dilate upon the significance and inspiration of the "Made-in-Canada" propaganda, but the question naturally arises, what concern gave birth to the splendid idea of so branding its goods.

To a leading Canadian paper firm belongs the honor and credit, for it was away back in 1896 that these words first appeared on a red seal, which was used as a trade mark by Ritchie and Ramsay, Limited, the pioneer coated paper manufacturers in Canada whose plant is located in New Toronto. Some eighteen years ago they put on the market "Red Seal" brand of coated paper, and a neat red wafer, similar to that frequently attached to legal documents, was designed for sticking on the packages. In a scroll was the new patriotic motto "Made-in-Canada". Later the trade mark "Red Seal' 'was registered, and has been used by the firm ever since, although, of course, the phrase in question, which is now applied to so many lines of goods, was not covered in the copyright.

When interviewed on this subject by the Pulp and Paper Magazine, Mr. Frederick A. Ritchie, President of the company, said, while he was not boasting of the fact or proclaiming it from the house tops, he believed that he could honestly claim to be the originator of the words. One or two others had maintained that they were the first to make use of them, but he thought he could establish to the satisfaction of anyone that his firm were the first to print "Made-in-Canada" on their goods in connection with their widely known "Red Seal" brand.

In 1892 two young men, who had been for several years in the employ of the head office of the Canada Paper Co., in Montreal, came to Toronto, and put in operation the first coating paper mill in the Dominion for the manufacture of such papers for lithographing and fine printing processes. They began in a small way with one coating machine and one stack of supercalenders. These gentlemen were F. A. Ritchie and C. N. Ramsay. They decided upon Toronto for their headquarters, owing to the city being the centre of the printing and publishing industry, and the splendid prospect that it offered for development of the business as in this branch of the paper trade, more than any other, it is essential for the mill to keep in close touch with the users in order to meet their exacting requirements. On account of the large space necessary for the economical operation of the process, shipping facilities and other advantages, the firm selected New Toronto as a suitable site for the location of the plant.

They had many obstacles to overcome, for up to that period all coated papers had been imported principally from the United States and Germany, and there was much talk about this country not being able to turn out coated stock of a satisfactory nature. Not only were the firm the pioneers in this line, but they had to blaze a trail to demonstrate to the trade that a thing, which had hitherto been regarded as impossible, could be done. They turned out high grade lines and uprooted local prejudice. Business began to come their way, and each succeeding year showed a gratifying increase in output. New branches were introduced, and the reputation of the house and the quality of their goods were so well established that to-day the capacity of the plant is four times what it was during the first few years of operation. New machines have been installed from time to time, and only a couple of years ago a large extension was erected for cutting, sorting and packing, enabling the plant to double its output. The firm are also large producers of coated cardboard and have offices in both Montreal and Toronto. In 1904 an incorporated company was formed with the title of Ritchie and Ramsay, Limited, Mr. Ritchie being the President, and looking after the financial and sales end, while C. N. Ramsay, Vice-President, ably supervises the manufacturing end and spends all his time at the mill. The city offices of the company had just been removed from top floor of the Ogilvie Building at the corner of Wellington and Bay Streets, Toronto, to the first floor of the Jessop Building at 80 Bay Street.

Mr. Ritchie has had some thirty-seven years' active and thorough acquaintance with the paper trade. Montreal is his native city, and, after completing his education, he secured his first position, in fact the only one he ever held before embarking in business for himself—with the Canada Paper Co., at the head of which was William Angus. This was in 1878, and the subject of this reference started in as office boy. Then he became a clerk in the office, and was next given a place on the selling staff. He travelled Eastern Ontario, Quebec and the Maritime Provinces, as well as looking after the trade in Montreal. Then he was promoted to an important post in the warehouse, being given full charge and looking after the buying, for the Canada Paper Co., in those days, handled a number of general lines which they did not produce at their mills, these being principally imported papers. For fourteen years Mr. Ritchie was in the service of the company, and during that period had formed a close friendship with another young man on the staff in the person of his partner to-day—Mr. Ramsay—who had charge of the manufacturing of goods such as envelopes, tablets, papetries, etc.

Having received a splendid insight, and a solid connection with the trade, and having saved his money during his employment with the firm, Mr. Ritchie concluded that there was a good opening in Canada for the making of coated paper. In 1892, as already stated, he started the manufacture of this line at New Toronto, Mr. Ramsay being taken into partnership shortly afterwards. The success of their venture is too well known to require extended reference.

In 1900, along with other business associates, Mr. Ritchie established the Kinleith Paper Mills in St. Catharines, for supplying raw stock to the plant of Ritchie & Ramsay, but disposed of his interest in this industry some five years later. Mr. Ritchie has held the office of Chairman of the Coated Paper section of the Canadian Pulp and Paper Association, of which he is a strong supporter, and also one of the veteran members of the Commercial Travellers' Association, holding his thirty-third annual certificate.

Outside of business, he is a man of few hobbies, and his chief delight is a winter holiday, for he is very fond of travel. For many years he has taken a trip in mid-winter to the sunny south, the West Indies being his favorite haunt. There he generally spends several weeks, while Canadians are enduring zero weather. Attired in canvas shoes, a straw hat and a linen suit, he enjoys basking in the shade of a cocoanut palm, visiting the extensive plantations and strolling along the sea shore. He welcomes the heat, but not the cold. In July and August, when other members of the trade are at a fashionable watering place or some favorite family resort, to get a brief respite from torrid temperature or carking care, the visitor will find Mr. Ritchie at his office. He works steadily through July and August, but not in the months of February and March. He is a member of the Royal Canadian Yacht Club, the National Club, the Canadian Manufacturers' Association, F.R.C.S., London, and other organizations. Of a quiet and somewhat reserved disposition, he is not, to use a colloquial term, a "good mixer." He has opinions of his own, and is not afraid to express them. Among the trade he is regarded as a man of good judgment, executive ability and high sense of honor, which qualities have contributed in a large measure to the commanding position that Ritchie & Ramsay enjoy to-day in the paper making world. An ardent admirer of Canada and Canadian institutions, he has every faith in the stability, progress and splendid future of the Dominion.

The German Paper Industry

By GROSVENOR M. JONES.

The present war in Europe is of special significance to the paper industry of the United States since the principal nations involved—Germany, Great Britain, France, Austria, Russia and Belgium—together produced in the last year of peace about one-half of the world's production of paper. The combined production of the nations now at war probably exceeded that of the United States in 1913 by about twenty per cent.

In the production of paper and board, Germany ranks next to the United States. According to the only complete and valuable statistics of the world's production, those compiled by Krawany, the leading countries produced in 1909 the following quantities of paper alone:

Country.	Tons of 2,000 Pounds.
United States	3,193,300
Germany	1,486,100
Great Britain	952,600
France	665,500
Austria	398,200
Canada	282,700
Sweden	258,500
Italy	254,100
Russia	245,300
Belgium	145,200
Norway	136,400
Finland	118,800
Netherlands	89,100

The above figures probably represent the relative standing of the great paper producing nations at the outbreak of the present great war on August 1, 1914. Moreover, they are probably as nearly accurate as such figures can be since they have been quoted with approval by Herr Ditges, the able and well-informed general secretary of the German Paper and Chemical Pulp Manufacturers' Association, in an interesting brochure issued in June, 1914.

The degree to which the paper industry has been curtailed in the countries at war is hard to estimate except in the case of Belgium, but it is safe to say that production has been greatly reduced in all of the others. This curtailment has been, no doubt, quite marked in Germany, since a large proportion of the paper and pulp production of that country is in times of peace sold over the seas which are now closed to her trade.

The paper and pulp industry of Germany has developed marvellously in the last thirty years. This fact is graphically illustrated in Chart 1, which shows the increase in consumption of wood manufactured into chemical pulp in Germany in 1885, 1900, 1905, 1910 and 1913.

The quantities in the chart are based on statistics compiled by the German Association of Chemical Pulp Manufacturers, and are expressed in terms of festmeters. A "festmeter" is a solidly piled compact cube of wood, one meter of about $3\frac{1}{4}$ feet in each

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* The charts and much of the data presented in this article have been taken from a pamphlet entitled "Deutschlands Papier- und Zellstoff-Industrie," prepared by General Secretary Ditges in June, 1914, in connection with the exhibits of the paper industry at the Bugra in Leipzig last summer. The whole is combined in an article in the annual number of the "Paper Trade Journal."

dimension, and has been estimated to be nearly 3/8 of a cord (or 128 cubic feet) piled in the ordinary American way.

In the following table the quantities of pulp wood consumed in the years 1885, 1900, 1905, 1910 and 1913 are stated in terms of cords piled in the American manner:

Year.	Quantity in Cords.
1885	48,435
1900	485,818
1905	668,917
1910	1,085,018
1913	1,342,604

It will be observed that in the fifteen years between 1885 and 1900 the annual consumption of pulp wood for chemical pulp manufacture alone increased from 48,435 cords to 485,818 cords, or ten fold. In 1905 the consumption was 183,099 cords, or 37.7 per cent, greater than in 1900. Between 1905 and 1910 the increase was 416,101 cords, or 62.2 per cent, the actual gain being almost equal to that made between 1885 and 1900 when the chemical wood pulp industry in Germany was an infant industry. Great as the consumption was in 1910, there was a still further development in the next three years, for in 1913 it had reached the enormous figure of 1,342,604 cords, a gain of 257,586 cords in three years, and of 673,687 cords in the eight years since 1905.

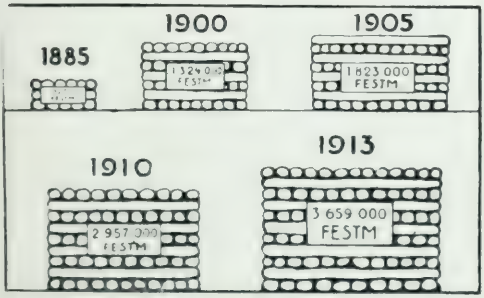

Chart. 1.—Quantity of Wood Used for Chemical Pulp.

The continuous rapid development in recent years, especially since 1910, is impressive, particularly to American pulp manufacturers who have seen the wood pulp industry in the United States make comparatively slow progress during that period.

How did Germany accomplish it? Where did she get the wood? Surely not from her own territory which has a population of more than 68 millions in an area considerably less than that of Texas.

Before attempting to answer these questions, it might be well to state that the total consumption of wood in 1913, in both the mechanical and the chemical branches of the German wood pulp industry, has been estimated at more than 5,000,000 festmeters (1,834,660 cords), which at the then prevailing high price of 20 marks ($4.76) per festmeter delivered at mill cost about 100,000,000 marks, or $23,800,000.

Germany imports the major portion of its pulp wood from Russia and Austria. In the year 1913 1,416,628 short tons of pulp wood valued at $8,865,500 were imported into Germany and of this amount Russia supplied about 80 and Austria nearly 20 per cent.

Germany draws on local supplies as well, for it has, in spite of its small area and great population, large forest reserves which are ably managed by the State and which yield a large annual supply of wood.

A considerable quantity of straw is also converted into pulp in Germany and there has been a large increase in the amount consumed, as is shown in Chart 2.

In the above graphic chart the quantities are shown in metric tons, but in the following statement are given in tons of 2,000 pounds:

Year.	Quantity. in Short Tons.
1900	58,422
1905	74,957
1910	103,617
1913	126,766

From the above it will be seen that in this branch of pulp production also there has been a large and steady increase.

The above chart indicates the quantities of wood and straw consumed in the production of chemical pulp. Chart 2 shows the quantities of chemical pulp produced in 1900, 1905, 1910 and 1913:—

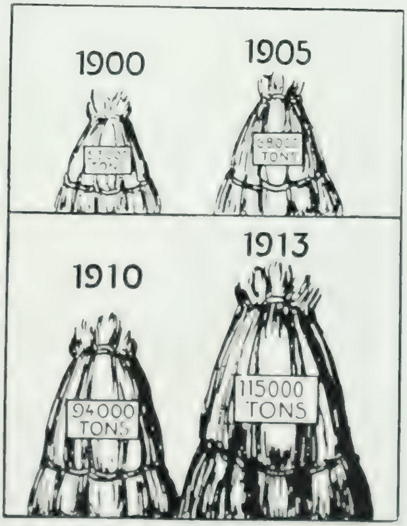

Chart 2—Quantity of Straw Used for Straw Pulp.

In the following tabular statement the quantities shown in the above chart have been converted from metric tons into tons of 2,000 pounds:

Chemical Pulp Production.

Year.	Quantity in Short Tons. Total.	Made from Wood.	Made from Straw.
1900	343,921	319,670	24,251
1905	457,459	426,594	30,865
1910	753,980	710,990	42,990
1913	924,838	871,927	52,911

In addition to the above production of chemical wood and straw pulp there was a small importation of mechanical wood pulp, 3,992 short tons in 1913, and of chemical pulp, 39,570 tons in 1913. Finland supplied most of the mechanical pulp imported and Sweden more than half of the chemical pulp.

But Germany is also a large exporter of pulp. In the year 1913, the last complete and normal year for which statistics are available, Germany exported 8,276 tons of mechanically ground pulp and 197,824 tons of chemical pulp.

More than one-fifth of the total production of chemical pulp in 1913 was exported.

If other indications were lacking to show the efficiency of the German chemical pulp industry, the fact that relying largely on foreign supplies of wood it could nevertheless produce chemical pulp cheaply enough to dispose of one-fifth of its product in foreign markets at a profit, is sufficient evidence of German manufacturing ability.

Commenting on the great development in export of chemical pulp, Herr Ditges says:

"They demonstrate that German manufacturers of paper and board will not lack raw material in the immediate future, nor indeed thereafter."

To what countries did Germany export pulp in 1913? The greater part of the chemical pulp sold abroad—6,797 short tons out of a total of 8,276 tons—were shipped to France, while 748 tons went to Italy; of the 197,824 tons of chemical pulp exported in 1913, France took 45,210 tons, Great Britain 40,011 tons, the United States 38,853 tons, Italy 25,960 tons, and Belgium 11,279 tons.

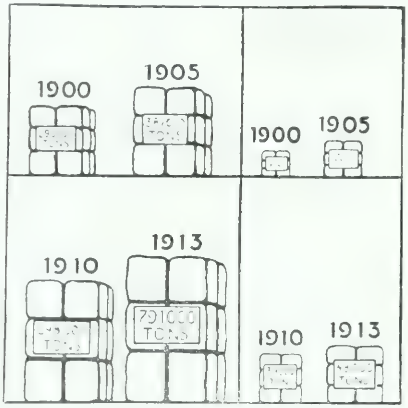

Chart 3.—Chemical Wood Pulp. Straw Pulp.

Italy is the only country of those just mentioned with which Germany can now do business, and since Italy's purchases are small, it is easy to see that the chemical pulp industry of Germany has been curtailed at least 20 per cent by reason of the loss of its foreign trade in pulp alone. The decline has probably been much greater than that, since more than four-fifths of the pulp is ordinarily converted into paper in Germany, much of which also finds a market abroad.

This naturally leads to the question of the quantity of paper and board produced in Germany.

According to figures prepared by General Secretary Ditges, the quantity and value of paper and board manufactured in Germany in the years 1909, 1910, 1911 and 1912 were as follows:

Year.	Quantity in Short Tons.	Value.
Paper and Board.		
1912	2,183,405	$123,891,363
1911	2,032,454	115,135,243
1910	1,974,000	112,471,379
1909	1,663,574	98,705,912
Paper.		
1912	1,776,087	$109,571,373
1911	1,653,956	102,167,054
1910	1,583,478	99,093,277
1909	(a)	(a)
Board.		
1912	407,318	$14,319,990
1911	378,498	12,968,189
1910	390,522	13,378,102
1909	(a)	(a)

(a) Not separately shown.

It will be seen from the above table that in the four-year period—1909-1912—the production of paper and board increased over 31 per cent. An increase of over 31 per cent in the quantity of paper and board produced is a wonderful showing indeed and is an index of the superior economic advantages the industry in Germany enjoys.

While the quantity produced increased over 31 per cent, the value of product increased only 25.5 per cent. In other words, the average value of all the paper and board manufactured declined from $59.33 per short ton in 1909 to $56.74 per ton in 1912.

The lower average value in 1912 might seem to be a natural and efficient result of increased production, but in the face of increased cost of wood and advancing wages it indicates to Herr Ditges merely over-production and consequent price competition.

In regard to declining prices, the following chart, also prepared by Herr Ditges from the records of the Association of German Print Paper Manufacturers is of considerable interest, especially to the American manufacturer:

	Prices of News Print.
1872	$158.41
1874	151.20
1876	128.52
1878	112.32
1880	97.20
1882	89.64
1884	76.68
1886	64.80
1888	62.64
1890	61.56
1892	50.76
1894	47.52
1896	44.99
1898	49.68
1900	55.08
1902	49.14
1904	45.90
1906	47.52
1908	46.44
1910	46.44
1912	45.36
1914	45.36

The prices for newsprint paper shown in this chart have been brought down to the year 1914. It will be noted that the price of newsprint touched its lowest level in 1896 when it was only $44.99 per short ton, and that since 1910 the price has been $45.36, or only a fraction above that in 1896 although the intervening period prices have ruled as high as $55.08 per short ton.

It will be noted also that the price in 1906—$55.08—was the highest in the entire period from 1892 to 1914. From the low level (44.99) of 1896, there was a rapid increase to $55.08 in 1900, an increase so great as to occasion a tariff controversy between the Germans newspapers and paper manufacturers which rivals in bitterness the long contest between similar interests in our own country.

A very interesting history of the controversy in Germany appeared last year in a monograph written by Dr. Alfred Hoppe on the subject, "History and Criticism of the Duties on Paper in the Tariff Act of 1902."*

A reading of this monograph discloses the fact that the positions taken and the arguments advanced by the German press were very similar to those of the American Publishers' Association and of its leading representative, the late John Norris.

In regard to exports and imports of German paper and board, it should be noted that there was an increase of 15.6 per cent in the quantity exported and a decrease of 4.6 per cent in the quantity imported in the year 1913, as compared with the preceding year. The total exports in 1913 were 282,290 short tons, while the imports were only 32.134 tons.

Wrapping paper, colored in the pulp, is the principal export. In 1913 93,513 tons were exported, or more than twice the quantity exported in 1911. Printing paper to the amount of 75,782 tons were exported in 1913. The exports of board of all kinds totalled 50,991 tons and of writing paper 19,890 tons.

Great Britain was Germany's best customer in 1913, as for many years preceding. Great Britain purchased 77,959 tons, or 27.6 per cent of the total quantity exported by Germany in 1913. Of every principal class of paper and board exported except two Great Britain bought more than any other country. On the other hand, Great Britain sold Germany very little paper, 2,167 tons in all.

Next in importance to Great Britain in the quantity of paper purchased from Germany in 1913 were the following countries:

Country.	Tons of 2,000 Pounds.
Netherlands	28,795
Argentina	23,116
Belgium	20,819
Brazil	14,390
United States	13,935
Switzerland	8,579
Denmark	6,427
Austria-Hungary	6,250
France	5,583
Japan	5,444
Cuba	5,399
South America	4,524
Sweden	4,388
Balkan States	3,615
Italy	2,994
Norway	2,687
Dutch Indies	2,136
Russia	1,845
Spain	1,438
China	1,403

A glance at the above list of countries will serve to indicate how greatly the war is now affecting the export trade of the German paper industry. In 1913 the German exports of paper and board were more than one-eighth of the total production. Even if the exports to those countries with which Germany can presumably still do business, namely, Netherlands, Switzerland, Denmark, Austria, Sweden, Italy and Norway, should continue on the high level of 1913, nevertheless, a curtailment of at least 10 per cent in production would be required to meet the loss in trade with the other countries.

Merely on the basis of loss of foreign business alone the German paper industry has had to decrease its production at least 10 per cent below the high production of over 2,000,000 short tons in 1913, just as the German pulp industry has suffered a loss of at least 20 per cent on the same account.

Just how much the production has been curtailed by reason of lack of required number of employees to operate the plants and by falling off in the local consumption is difficult to say, but it is probable that the 1915 production of paper and board in Germany will not be more than 50 per cent of the quantity produced in 1913. It should be remembered that Germany is a great book publishing country, and that the many great publishing houses at Leipzig have now a greatly decreased output.

The manufacturers of the United States are interested in knowing the principal classes of paper exported in 1913 by Germany to Argentina, Brazil, the rest of South America, Cuba, and to this country.

The great bulk of Germany's exports to Argentina -17,225 tons out of 23,116 tons- consisted of newsprint paper. In addition, Argentina imported 3,325 tons of pulp board and 1,441 tons of writing paper.

Brazil's imports from Germany consisted of 10,491 tons of wrapping paper, 2,556 tons of photographic, filter and wall paper, 1,806 tons of writing paper, 1,730 tons of board and 1,642 tons of print paper, in addition to smaller quantities of various other classes of paper.

Cuba's imports from Germany consisted chiefly of wrapping paper, the quantity imported amounting to 5,241 tons.

The principal class of German paper imported by this country in 1913 was photographic, filter, wall and other paper, the quantity being 6,428 tons, or about one-half of the total quantity of this class of paper exported by Germany. Next in importance was wrapping paper, but this country imported only 4,839 tons from Germany in 1913.

Comment of U. S. Commerce Reports.

The German paper industry has suffered more than most other industries from the war. Many manufacturers were forced to limit their output at the beginning of the war. Many workmen were drawn into the army, and the closing of some mills forced others out of employment. The union of manufacturers did much to alleviate the condition of these workmen.

The real difficulty of the paper industry during the war has been to obtain the supply of raw material, particularly wood, which formerly came from Russia and other foreign countries. The present price of certain raw materials, such as sulphate cell stuffs, is almost prohibitive. These prices, together with those for glue, oil, felt and other manufacturing materials, as well as the lack of labor, furnish difficulties which can scarcely be overcome.

Prices of all kinds of paper have been depressed by the prevailing crisis. Press paper has not been affected as much as other papers. In spite of some opposition the German Union of Presspaper Manufacturers has decided to extend its agreement so that the union will continue in force another year, and is expected to form a center by which the whole German paper market will be sustained. Other papers affected are packing paper and tallow-coated paper, which not only show a serious falling price but also it is stated that the man ufacturers of these varieties show an inclination to close their plants in the course of the next month or two if prices do not improve.

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* "Zur Geschichte und Beurteilung der Papierzölle im Zolltariff von 1902."

The so-called fine paper (Luxuspapier) branch has the limitation of consumption. The post card branch was affected in the early part of the war, because of the international character of this business, and many partially completed contracts were annulled. In the boxboard industry increased prices were necessary because the cost of manufacturing has been enhanced. This industry is still well employed because of the demands upon it for war material, such as food containers.

The lack of jute containers and the fact that the Government has officially required paper containers to be used industrially where jute was formerly utilized has indirectly assisted in alleviating the condition of the paper industry. Nothing better can be suggested to help the wood-pulp and paper business in this crucial time than the local production of wood materials. This suggestion, however, comes too late to be of much assistance in the present war.

The crisis of the German paper business has been caused most of all by the cutting off of the export business by the war. The export business of fine paper was particularly substantial, and this branch has suffered accordingly. It is also true that the countries at war with Germany have been large buyers of German paper. Of the great foreign markets to which Germany formerly shipped only America remains. The war has presented shipping difficulties which make exportation to America inadvisable. If the manufacturers cannot find satisfactory means to dispose of their products in neutral countries, and if the price conditions of the market do not improve, a further closing down can be expected.

Canadian Wood Pulp Case Up Again

(Special to Pulp and Paper Magazine).

Washington, D. C., March 10, 1915.

One of the most important cases before the United States Court of Customs Appeals has just been decided when that body reversed the opinion of the Board of United States General Appraisers involving the importation of Canadian wood pulp and news print paper. The Court, decided that "under our statute and under the facts shown, this wood pulp and news print paper were not entitled to free entry."

The case was heard before Judges Montgomery, Smith, Barber, DeVries and Martin. Assistant Attorney General Bert Hanson appeared for the United States, and Allan R. Brown for the appellees, the Laurentide Company. The opinion, which is of unusual interest, was written by presiding Judge Montgomery, who says :

"The merchandise the subject of importation in this case consists of certain wood pulp and newsprint paper exported from the Province of Quebec, Canada, into the United States. It was assessed at the ports of entry under paragraph 409 of the tariff act of 1909 at three-sixteenths of 1 cent per pound, and for the reason that the Province of Quebec had prohibited the free exportation of wood from which pulp and newsprint paper were manufactured an additional one-tenth of 1 cent per pound.

"The evidence shows that the wood pulp and newsprint paper imported were made from wood grown and cut on Crown lands in the Province of Quebec; that section 13 of the Canadian woods and forest regulations of April 26, 1910, contained a prohibition and restriction against the exportation of such wood. The evidence further shows that in the winter of 1911 and 1912 the wood from which the product was manufactured was cut from these Crown lands; that it was run down streams in the summer and manufactured into wood pulp and into news print paper during the winter of 1912 and 1913. The precise time at which it was manufactured is not shown as to all the material, although the testimony of the importers' witness is to the effect that the wood was ground up into paper (pulp?) probably all since the 1st of December, 1912.

"The importers duly protested against the assessment as made by the collector, and their protest having been sustained the case is brought here for review.

"There are numerous assignments of error, some relating to the exclusion of testimony offered on cross-examination and others going directly to the merits of the case, error being assigned on the order of the board sustaining the protests and specifically in holding that the merchandise was manufactured from wood on which there was no prohibition or restriction of exportation either by contractual relation or otherwise, directly or indirectly. The latter assignment of error presents the meritorious issue in the case.

"As before stated, under section 13 of the Canadian woods and forests regulations, prohibition against the exportation of wood cut on Crown lands was in force. This prohibition remained in force, so far as this record discloses, up to the 31st of December, 1912. At that date an order was entered by the lieutenant-governor in council which provided that article 13 of the woods and forest regulations 'shall not apply to timber cut from the 1st day of May, 1911, and which will be cut thereafter on the timber limits hereinafter described; and that all pulp wood cut from the 1st day of May, 1911, or which will be cut hereafter on the said timber limits, or the paper, paper board, or wood pulp manufactured from the wood cut on such timber limits, may be exported free of any export duty, or any other charge of any kind whatsoever, or any prohibition or restriction in any wise relating to such exportation.' The timber limits described covered those from which the importations in question were manufactured, was cut.

"There was evidence showing that the power to enter an order suspending the provisions of article 13 of the woods and forest regulations was vested in the lieutenant-governor in council, and it was testified by an expert witness, an attorney of Canada, that he had power to make his order retroactive.

"Accepting this testimony as establishing the facts claimed and assuming the entire good faith of the transaction, the question is still left as to whether the importers have made a case which overcomes the presumption of correctness which attaches to the assessment of the collector. The claim of the importers is that under the terms of section 2 of the act of July 26, 1911, the importation in question is entitled to free entry.

"This section provides for the free entry of pulp wood, pulp, and news print paper of the quality here in question, on the condition precedent that no export duty, export license fee, or other export charge of any kind whatsoever (whether in the form of additional charge or license fee or otherwise), or any prohibition or restriction in any way of the exportation (whether by law, order, regulation, contractual relation, or otherwise, directly or indirectly), shall have been imposed upon such paper, board, or wood pulp, or the wood used in the manufacture of such paper, board, or wood pulp, or the wood pulp used in the manufacture of such paper or board."

"This section was construed by this court in Cliff Paper Co. v. United States (4 Ct. Cust. Appls., 186; T. D. 33435), and it was there said:—

"It is thus provided by the condition precedent that free entry into this country shall be had by Canadian paper or wood pulp only when the given paper and wood pulp, and the wood from which they were manufactured, are entitled to exportation from Canada free of any export charge or prohibition or restriction of exportation.

"This case established the rule that the question in each case is whether the particular importation is itself subject to no prohibition or restriction of exportation and that the wood from which it is manufactured is alike free. It would seem that a fair reading of the condition itself would establish that freedom from restriction upon the right to export wood must be continuous from the time it is cut from the stump and becomes wood up to and including the time of its manufacture into an advanced product. If this were not so, the reasonable and logical time and opportunity for marketing the product as wood may have passed by and the restriction may have worked out a result in direct opposition to the purpose of the act.

"The purpose of this restriction or limitation on the free importation of wood and paper provided for in this section is too clear to require extended comment. It obviously was an attempt to make possible the importation from Canada of pulp wood in the raw state for the use of our own manufacturers. It would not at all answer this purpose to say that at the time of exportation of the product in its manufactured state as wood pulp or news print paper the wood from which they had been manufactured would have been admitted free had it up to that time remained in its condition as wood, and it would certainly impair very materially the advantages to be derived from such freedom from restriction if at any time after it was cut from the stump it was subject, for any period whatever, to restrictions or prohibitions of exportation.

"But the question here presented is still more narrow. It is whether it is sufficient to answer this requirement that there shall be no prohibition or restriction of exportation of wood or export duty chargeable against such wood from which the wood pulp has been manufactured existing at the very time of the exportation of such advanced product or whether the freedom or restraint of exportation must have existed at least at the time when the wood was manufactured into wood pulp. Upon this question there would seem to be no room for doubt. Assuming the power of the lieutenant governor in council to make an order relating to timber limits retroactive as it affects the rights of the licensee as between itself and the Dominion of Canada and its Provinces, it is clear that he has no power to defeat by such an order the purpose and letter of the condition to free entry which our own statute imposes. The time has elapsed when a right to free exportation can for an instant be vested in the owner of this pulp wood. It is apparent from this record that as early as the 1st of December, 1912, the manufacture of this particular wood was entered upon. To what extent it was manufactured before the 31st of December the record fails to show, and as the burden of proof is upon the importers, who attack the assessment, and as we have no means of distinguishing between pulp and print paper thereafter manufactured from that which was manufactured during the month of December, we must treat each alike, and it follows that at the time of the manufacture of a portion at least of this product there was in fact an absolute prohibition against the exportation from Canada of wood in the form in which it was cut from the land. The fact that subsequently the empty right to export wood, which is no longer in existence, but which has become something else, is given does not meet the condition in our law. This consideration is alone sufficient to show the error in the result reached.

"It is due to the Board of General Appraisers to state that this point appears not to have been pressed to their attention. The decision of the board must, however, be reversed."

Ottawa Notes

Ottawa, Ont., March 10.

The operation of the National Transcontinental Railway in Northern Ontario and Quebec so as to afford facilities for the shipment of pulpwood from the Abitibi district down to the Quebec mills was the subject of a debate in the Senate last week, and will be brought up again this week when a resolution on the subject is expected to be moved.

The railway was finished last autumn, but the Government did not operate it during the winter. On this account Senator David, of Montreal, severely criticized the administration. He pointed out that the Abitibi district was rich in pulpwood, as well as possessing great supplies of timber. Settlers in that district were anxious to clear their lots by removing the wood thereon and selling it to the pulp mills, and as there are now 1,500 lots, this would mean, providing that only 30 cords were cut on each lot, a total shipment of 45,000 cords. A settler, said Senator David, could cut 30 cords in a month. He estimated that if this pulpwood were carried to Hervey Junction over that part of the line from Hervey Junction to Abitibi at a rate of $2.50 per cord at least 40,000 cords of the commodity as well as some two million feet of lumber, would have been available for shipment to the mills.

Senator Cloran supported Senator David, but Senator George Gordon, the Cache Bay lumberman, contended that it would be an economic impossibility to ship pulpwood from Abitibi to the Quebec mills. This was so because the pulpwood could be taken over the Temiskaming and Northern Ontario Railway and Grand Trunk down to Niagara Falls, a distance of only 400 miles as compared with some 700 miles to the Quebec mills. The T. and N. O. Railway was now giving the exceptionally low rate of one half a cent per ton per mile. "I would say further," he continued, "that thousands of cords more would come down from Cochrane and that vicinity and be marketed in the American market in the frontier this year were it not for the fact that pulpwood is being brought in during the summer months from the Island of Anticosti at a much cheaper price than it can be delivered for from up there. Thousands of cords go from Anticosti right up to Ogdensburg. Last summer I had occasion to ask one of the firms which were purchasing wood from Anticosti why it could not purchase more of it from Northern Ontario and Quebec, and that was the answer I received. I want to point out further that around Abitibi during the winter pulpwood is being taken out and sold by the farmers, delivered in Lake Abitibi at a price which I am sure they could not obtain to bring that pulpwood either east or west. I think I have demonstrated that it is an economic impossibility to ship pulpwood from up there."

No reduction of wages will be made as regards the employees in the J. R. Booth pulp and paper mills. Although a great many pulp and paper firms in this district, following the example of other companies who have suffered a decline of business as a result of the war, have reduced wages, this will not be done in the case of the big Ottawa industry, as the result of a conference between Mr. Booth and his men. Such a move was suggested some time ago, it being proposed to pare down wages 5 cents per hour for all grades. The employees decided to oppose such a move, and had called a meeting to arrange to do so when Mr. Booth himself took the matter up. He met a committee of the men, and informed them after discussion that their wages would not be cut. This decision has increased Mr. Booth's great popularity with his men.

The E. B. Eddy Company of Hull is opposing an application by the Ottawa Electric Railway for a loop through the park beside the Eddy mills, and has notified the Hull City Council that it will fight any such move.

Lumbermen and paper manufacturers in this district are taking a somewhat pessimistic view of the probabilities for low water again next year. The snowfall around Ottawa this winter has been exceptionally light and does not promise to increase, while all predictions are for an early spring. Under the circumstances it is feared that the level of the Ottawa river may be even lower than it was last fall. This means thousands of dollars' loss to the lumber and paper industries which secure their power from the river. Coming at a time when paper prices are high, this will be particularly unfortunate.

Just at present the water situation has temporarily improved, recent thaws having raised the level considerably. The Booth and Eddy companies are now able to manufacture a large part of their own pulp.

MAC.

Trade Notes

At the annual meeting of Ritchie and Ramsay, Limited, coated paper manufacturers, Toronto, the reports for the past year were very satisfactory considering the general state of business. F. A. Ritchie was re-elected President and C. N. Ramsay, Vice-President.

F. A. Ratcliff of the Ratcliff Paper Co., Toronto, has gone on an extended business and pleasure trip to the South and will visit the Panama-Pacific exhibition before his return.

Frank Martin, formerly with Barber and Ellis, Limited, Toronto, who for a number of years has been on the staff of the Wilson Stationary Co., Winnipeg, is spending a few weeks in the east. The Wilson Stationary Co. is one of the largest concerns in the west having branches at many pointss.

A writ has been issued against the Hinde and Dauch Paper Co. of Toronto by Gibbons-Kemp Co., claiming $2,000 for installing "complete fuel saving and smoke consuming system" in four boilers at $500 a boiler.

James Henderson, who has resided in Toronto for thirty-five years, passed away last week at the age of seventy-six. For many years he held a responsible position with the Dominion Paper Box Co., Toronto.

A very handsome booklet entitled "Paper Specialties, Made-in-Canada" has been issued by the Interlake Tissue Mills, Limited, of Merritton and Toronto. The illustrations of the various lines of tissue, toilet and specialties produced by the company are attractive and numerous.

The Hinde and Dauch Paper Co., Toronto are now turning out solid fibre board boxes which are being used by shoe and other factories for shipping purposes, the containers being lighter, safer and more economical than wooden boxes.

The Winnipeg Paper Co., Limited, Winnipeg, have written to Secy. Raymond of the Retail Merchants Association of Saskatoon, to the effect that waste paper can be turned into profit, and that if merchants of Saskatoon will deliver their paper at a central point, bale and ship by the car load to Winnipeg, they will be paid seven dollars per ton, f.o.b. Producers of waste paper in Calgary, Regina and Medicine Hat are already shipping to Winnipeg. It appears that several printers and others in western cities have been getting some one to haul their waste paper to the nuisance ground, but that now many of them will put in bales, bale paper and haul it to the railroad for about one tenth of what it would cost them to have it destroyed. In return they are getting more than enough for freight and cartage several times over

A splendid site has been purchased on Wellington street, west of Spadina Ave, Toronto, by the Butterick Publishing Co. of New York, who will soon commence the erection of a factory and warehouse to cost in the neighborhood of $100,00. L. S. Yolles is looking after the local interests of the company and the structure will be a very attractive and substantial one.

Louis Houpt of the George Irish Paper Co., of Buffalo, was in Toronto, Montreal and other points last week calling on trade. The Monarch Paper Co. of Toronto, which obtained a charter and is under the management of E. A. Crippen, has done a good business during the past year and is a branch of the Irish Paper Co. As soon as times revive branches will be opened in other cities in the Dominion.

SCANDINAVIAN CONDITIONS.

According to information, which has come to hand from different sources in the Swedish paper, "Stockholms Dagblad," the depression, which of late has been ruling on the paper market, now seems to be decreasing. Especially as far as Sweden is concerned a good demand is reported for sulphite wrapping, while the market for news contrary to expectations is very dull. More so than the majority of other industries, the paper industry is dependent on general conditions, and the more developed the industry and trade of a country is, the larger is the consumption of paper. The efforts, which are now being made in all countries to keep factories and industries running and to get business in general back to the normal promises better times for the paper industry and indirectly also for the pulp and cellulose industries.

NEW PATENTS

PAPER STOCK SCREENING MACHINES.

ARVIN R. PAULL, Inventor.

Patented Canadian Patent Office, September 1st, 1914, No. 157696.

In describing his invention, the inventor says:—

This invention relates to improvements in screens for paper stock and like material, and the object is to provide a simple, durable and compact machine for removing splinters, sand, and foreign material from paper pulp before it is passed into the paper making machine.

FIG 1.

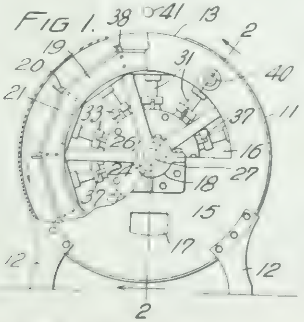


FIG. 4.

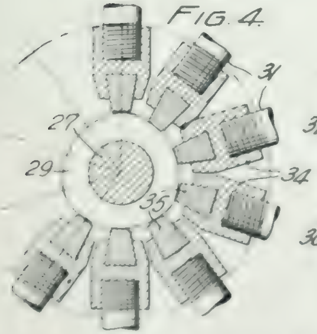
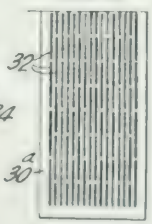


FIG. 5.



A further object is to provide a lighter and more compact machine having larger screening capacity and higher screening efficiency than machines at present in general use.

A still further object is to provide a screening device in which the vibration and consequent noise are retained as much as possible in the machine itself.

The diaphragm screens at present in general use consist of a series of horizontal screens which are vibrated by means of a cam shaft located beneath. The vibration of the diaphragms operates to draw the material through the perforations or slots thereof, the foreign matter being held back. These screens are set out in a row and the flow of material passes thereover, a portion being drawn through each screen. These machines are extremely heavy and cumbersome.

In the present invention, a polygonal cage is formed between the bars of which the screen plates are mounted. This screen cage is revolubly mounted upon a slowly revolving shaft, provided with a cam which engages shoes co-operating with the spindles of a series of plunger plates or pistons. The action of the cam imparts a vibrating or reciprocating motion to the plunger plates, and the paper stock is forced or sucked through the superposed and relatively stationary screen plates. Means are provided for conveying the splinters, sand, etc., to a discharging point where they are pushed off the screens.

In the drawings which illustrate the invention:

Fig. 1 is an end elevation of the device with a portion of the casing broken away.

Fig. 2 is a sectional view on the line 2-2, Figure 1.

Fig. 3 is a cross sectional view on the line 3-3, Figure 2.

Fig. 4 is an enlargement of the central portion of Figure 3 showing the throw of the cam engagement.

FIG 2

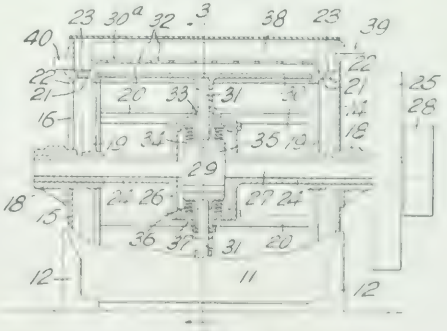


FIG 3.

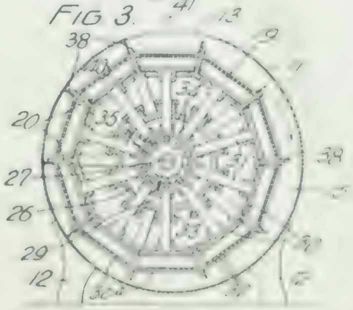


Fig. 5 is a half plan view of one of the screening plates.

Referring more particularly to the drawings, 11 designates a cylindrical casing mounted on legs 12 and provided at the top with a suitable opening 13 parallel with the axis. One end 14 of the casing is preferably solid, while the other end 15 is provided with a large inspection opening 16 in the upper part thereof, and with a small discharge opening 17 in the lower part. At each end of the casing, bearings 18 are provided.

Within the casing, a cage is located, consisting of polygonal spoked end members 19 connected by radially disposed separating blades 20, arranged longitudinally parallel with the axis of the cage. These blades 20 are secured to the end members 19 at the junctions of the faces thereof, as will be clearly seen from the drawings. Each of the end members 19 is provided with a circular flange 21 near the periphery thereof, which abuts similar flanges 22 formed on the inner sides of the casing ends. A circular packing ring 23 is provided surrounding the flanges 21 and 22, and forming therewith a sufficiently tight joint to prevent the passage of the paper stock between the casing and cage ends.

The cage is rigidly mounted on a hollow shaft 24, which revolves in the bearings 18 and 19 and is driven at suitable speed by means of a pulley 25 or any suitable gearing. The shaft 24 is enlarged midway between the ends of the cage to form a cylindrical cam box 26. A solid shaft 27 driven at comparatively high speed by means of a pulley 28 or other suitable arrangement passes through the hollow shaft 24 from end to end. Mounted on the shaft 27 within the cam box 26 is a small cam 29 having a plurality of very slight throws. This cam is shown much exaggerated in figure 4 as having three throwns or protesting portions, but this number may be varied as desired. The throw of this cam is very small, being in reality only about three-sixteenths of an inch for a cage of six feet or more diameter.

Between the partition blades 20 of the cage, rectangular plungers or pistons 30 are provided, each plunger plate occupying the space from one blade to the next and preferably from end plate to end plate of the cage. The plunger plates 30 are each mounted on a radial spindle 31 which passes into the cam box 26 through stuffing boxes 33. Each spindle is provided with a head 34 having a removable shoe 35 pressing against the cam 29. Springs 36 are provided to hold the shoes always against the cam, so that reciprocating motion will be imparted to the spindles 31. The load of these springs is suitably adusted by means of set screws 37. Mounted above the plungers 30 are screening plates 30a, which plates are rectangular in shape and set between the separating blades 20. These screening plates are provided with perforations or slots 32 of suitable size and shape. In some instances, elongated slots such as shown in Figure 5 will be preferred, while in other instances much shorter perforations which may be circular are preferred.

It will be noted in figures 1 and 3 of the drawings that the screen cage is mounted eccentrically within the casing 11, the eccentricity being in a horizontal direction. Each of the separating blades 20 is provided with a scraper 38 projecting beyond the cage. As the screen cage revolves, the scrapers gradually approach the casing until they come into contact therewith, as clearly shown in Figure 3. The splinters and other foreign matter which have been separated from the pulp are thus carried upwardly against one side of the casing to a suitable point where a flush pipe 39 is provided in one end of the casing and a drain pipe 40 in the other end. A rush of water is thus maintained over the surface of each plate, as it passes this point, so that all foreign matter is carried away by the water. To ensure absolute cleaning of the screening plates, a spray pipe 41 is located above the opening 13, and water is sprayed over the entire surface of the plate, which is thus washed clean and cleared of any particles of stock remaining in the perforations thereof.

Paper stock to be screened is delivered into the casing, for instance, through the aperture 13, and approximately fills the space between the casing and the screen plates. As the screening cage revolves, this paper stock is carried around by the scrapers 38 into the constantly narrowing space caused by the eccentricity of the cage and casing. During this movement, which results in a very slight compression of the stock, the rapidly revolving cam successfully engaging the shoes of the several spindles 31 causes the plungers to have a vibrating or reciprocating movement toward and away from the axis of the cage. During the outward movement of each plunger, a small amount of stock may be forced through the perforations of the screen plates, so that such perforations are prevented from clogging. During the return movement of the plungers, the pulp stock is sucked through the screen plates into the spaces between said plates and the plungers. In this way, each successive vibration of the plungers forces or sucks a little more pulp through, so that the interior of the cage becomes partially filled with the screened stock, which is discharged through the aperature 17. The paper stock fills whatever space there is between the edges of the plunger plates and the blades and cage ends, and acts as a seal so that the sucking or forcing action of the plungers is not hampered by leakage around the edges. The splinters, sand and other foreign matter which cannot pass through the perforations of the screen plates remain outside, and are carried by the scrapers 38 to the flushing point, as previously described.

In practice, the cage is preferably operated at about one revolution per minute or a trifle faster, while the cam shaft turns two hundred revolutions a minute. These speeds may, however, be varied according to the quality of stuff treated and the completeness of the screening required. The shape of the cam in a large measure opposes the vibrations to one another, and the nature of the machine centres all these vibrations at the axis of the rotor, so that only a minimum of vibration is transmitted to the building in which the machine is installed. The rotating cage carries the stuff around with it, so that screening is accomplished much more rapidly than when the stuff merely runs over the screens. Furthermore, the vibrating action of the plungers tending to draw or force material through the perforated screens adds greatly to the rapidity and effectiveness of the machine. To ensure smooth running, and minimize the noise and the vibration, the cam box 26 may be filled with heavy oil or grease, which is prevented from leaking out and mingling with the stock by the stuffing boxes 33. This oil may also be led through grooves, of well-known design in the oil shaft 24 so as to lubricate the cam shaft 27. While the device has been shown with screen plates extending from end to end of the cage, it is obvious that as many plates may be used in this length as desired, and each series of plates thus formed operated by its own cam. In the same way, long blades may be operated at each end by means of two cams. Various other mechanical changes may be made without departing from the spirit of the invention, which is not limited to the particular form shown.

Having thus described my invention, what I claim is:

1.—A device of the character described, comprising a casing, and a screen cage mounted eccentrically within the casing.

2.—A device of the character described, comprising a casing, and a rotating screen cage mounted eccenalso be led through grooves of well known design in trically within the casing, said screen cage having a plurality of screening devices mounted at the circumference thereof.

3.—A device of the character described, comprising a casing, an eccentrically mounted screen cage within the casing, and a series of plungers mounted in said screening cage.

4.—A device of the character described, comprising a casing, and an eccentrically mounted screen cage within the casing, said screen cage comprising a series of vibrating pungers and superposed screens.

5.—A device of the character described, comprising a casing and a revolving screen therein, formed of a plurality of vibrating plungers and superposed perforated plates.

6.—A device of the character described, comprising a casing, a revolving screen therein composed of a plurality of independently movable plungers and perforated plates mounted above said plungers, and means for vibrating said plungers.

7.—A device of the character described, comprising a casing, a rotating screen cage therein, vibrating plungers mounted in said screen cage, and scrapers carried by the screen cage arranged to circulate material to be screened within the casing.

8.—A device of the character described, comprising a casing, a revolving screen cage eccentrically mounted therein, scrapers carried by said screen cage co-operating with the casing to circulate the material to be screened, and means for removing foreign matter from the screen surface.

9.—A device of the character described, comprising a casing, an eccentrically disposed screen revoluble within the casing, vibrating plungers in said screens, perforated plates mounted above said plungers, and means for reciprocating the plungers with respect to the perforated plates to draw the material to be screened through said plates.

10.—A device of the character described, comprising a casing, a series of movable plungers and superposed stationary screening plates within said casing and means for vibrating the plungers to draw the material to be screened through said perforated plates.

11.—A device of the character described, comprising a casing, an eccentrically disposed screening mechanism revoluble therein, vibrating plungers and superposed perforated plates mounted in said screening mechanism, scrapers carried by said screening mechanism adapted to circulate the material to be screened and means for maintaining a flow of water across the screen plates.

12.—A device of the character described, comprising a casing, a screen cage revoluble therein, independently movable plungers carried by said screen cage, and a cam arranged to vibrate said plungers.

13.—A device of the character described, comprising a casing, a screen cage revolubly mounted therein, a plurality of perforated screen plates secured to said screen cage, independently movable plungers mounted below said plates, and a cam adapted to reciprocate said plungers with respect to the perforated plates.

14.—A device of the character described, comprising a casing, an eccentric polygonal screen cage revolubly mounted within the casing, fixed perforated plates carried by said screen cage, independently movable plungers mounted below said plates, and means for bibrating said plungers.

15.—In a device of the character described, the combination with a casing, of a cage revoluble therein, screening plates mounted in said cage, a plurality of independently movable plungers mounted below said screening plates, a hollow shaft supporting the cage, a second shaft mounted within the hollow shaft, a cam mounted on said inner shaft, and spindles supporting said plungers and engaging said cam.

16.—In a device of the character described, the combination with a casing, of a cage revolubly mounted therein, a plurality of plungers and superposed perforated plates mounted on said cage and forming together a polygonal screen, means for vibrating said plungers independently, and means for cleaning the foreign matter from the surface of said plates.

17.—A device of the character described, comprising a casing, a cage therein, a plurality of independently movable plungers and stationary screen plates mounted on said cage and forming a substantially cylindrical screen, scrapers carried by the cage intermediate said plates arranged to transport material to be screened, a hollow shaft revolubly supporting said cage, a solid cam shaft within said hollow shaft, spindles carried by said plungers engaging said cam shaft, means for holding said spindles in engagement with the cam shaft whereby vibratory motion will be imparted to said plungers, means for supplying material to be screened into the annuler space between the screen and casing, means for removing material passed through the screen from the interior of the cage, means for washing away material not passed through the screen, and means for washing obstructions out of the screen.

WATERPROOF PAPER MANUFACTURE

Canadians connected with the pulp and paper trade may be interested in the following particulars regarding waterproof paper which is used at a small factory recently established at Oyasu, Anagawa, under name of the Japanese Durable Waterproof Paper Manufacturing Co. The paper treated at the factory is made in Japanese prefectures of Nagano and Fukui, the product of the former giving the best results. The paper made in the latter, when finished, is somewhat stiffer and not so soft and pliable as that from Nagano. The paper is first cut into one foot squares and then pasted with a solution of gum at the edges. These paper squares are then taken and pasted onto a square revolving tin drum with edges slightly overlapping in order to join the squares together. The sides of the drum are about twelve by four feet. After one layer has been pasted down, another layer is laid on transversely, in order to give equal strength both ways to the paper, which, if pulled when untreated in one direction easily tears. The finished waterproof of Nagano paper consists, therefore, of two layers of paper pasted together with a solution invented by a Japanese named Saito, who now superintends the factory. The component parts of this solution are kept secret and no information on this point is available. In the case of Fukui paper there is only one layer as the paper made in the perfecture of Fukui is stiffer, although it does not absolve the solution as well as that from Nagano.

UNITED STATES NOTES

(Special to Pulp and Paper Magazine.)

The International Paper Company for the year ended December 31, 1914 report net earnings available for dividends on the preferred stock of $1,137,709, as compared with $993,805. in 1913. Last year's earnings was equivalent to 5.07 per cent as against 4.43 the preceeding interval. The total surplus at the end of the year was $11,630,869, as compared with $10,941,294 on December 31, 1913. Despite the increase in earnings, P. T. Dodge, says in his report to the stockholders, which together with the balance sheet has just been issued, that the year has been an abnormal and trying one in the paper industry. Foreign importations and unprofitable prices accepted by the domestic producers have been contributing causes. "The immediate depression," he continues, "throughout the country, resulting in a diminished value of advertising, has seriously affected the earnings of newspapers. Consequently there has not been the usual increase in the national consumption of newspaper. For sometime this increase which will return in time, has been at the rate of from 7 to 8 per cent per year."

* * *

Charles E. Spencer, one of the attorneys of the bankrupt Battle Island Paper Company, of Fulton, N. Y. returned to Oswego, from Albany last week where he went to again bring to the attention of the Attorney General Woodbury the necessity of an early settlement of the claims of his company against the State for $1,800,000, alleged damages to the plant at Fulton through the construction of the barge canal and the consequent loss of water power. It is hoped that the case may be one of the first to be heard by the newly organized Court of Claims.

* * *

Through a deal consumated in New York recently, George C. Sherman of Watertown, sold his entire holdings of common stock in the St. Regis Paper Company to G. H. P. Gould, of Lyons Falls, who acquired the stock of D. M. Anderson, some months ago. M. Sherman retains his preferred stock in the company, however.

* * *

"Conditions in the paper industry are better at the present time than at any time since last spring", remarked a large newsprint manufacturer of northern New York to your correspondent this week. "In fact the business has been better during January and February than it was during the same period in many years back. This is due to the heavy rains this winter which caused the water in the Hudson to rise sufficiently to give us the power we need." The prospects are bright for a continuance of the existing conditions. Within a few weeks the snow will be melting rapidly in the north woods and the flood waters will be rushing down the stream.

It is understood that the big pulp and paper mills of northeastern Maine are buying more pulpwood from operations than for years, as they find that they can buy the wood fully as cheap as they can cut it themselves.The Great Northern Paper Company has cut less wood this year than in the past, extensive purchases have been made of late, which is something new in the history of the company.

* * *

The Fonda Container Company, manufacturers of Purity Paper bottles began operations during the past fortnight at Fonda, N. Y. The plant is incorporated and its members are John Ross, E. Corning Davis, M. Michaels. The new company starts out employing about ten hands and has a capacity of from 18,000 to 20,000 containers per day.

* * *

Arthur B. Daniels, treasurer of the L. L. Brown Paper Company, Adams, Mass., has been honored by being elected to the presidency of the American Writing Paper Manufacturers Association.

* * *

The International Paper Company has just completed alterations at its mill No. 8 at Rumford, Me. The calenders have been moved and a machine weighing thirty tons has been placed between the paper machine and the calender. This new machine is known as the Yankee Drier and by its installation the company will now be able to manufacture a wrapping paper known as machine glaze, which grade was formerly imported from Germany.

* * *

The ground wood machines of the International Paper Company in Northern New York, are reported to be running on a full time basis, as water conditions are very satisfactory—the river being particularly free from ice.

* * *

The Andrews paper manufacturing business at Penn Yan, N. Y. has been incorporated under the name of John T. Andrews Company. The capital stock is $25,000, divided into 250 shares of $100. each. The directors are John T. Andrews, Charles T. Andrews and Clarence B. Andrews.

* * *

The Granby Pulp and Paper Company is erecting a large wood conveyor in connection with its plant at Fulton, N. Y. This will facilitate the handling of an increased stock of pulp wood.

* * *

A total of 2,500,000,000 stamped envelopes are used annually by the United States Government. There are 315 different styles, size and grades of wrappers used in the various departments. The contract for supplying these envelopes and wrappers was recently let to the Middle West Supply Company.

The Markets

CANADIAN MARKETS

The market conditions do not present much that is interesting in the way of new developments, except that news print plants report business has dropped considerably. Prices of print paper at the mills have fallen off quite a bit, especially in the case with firms which are seeking new outlets. The local demand for news print is not growing, and the foreign inquiries, which were so abundant and insistent after the outbreak of the war, have declined very much. Export trade continues to be good, and for the calendar year ending December 31, 1915, the exports of news print was $13,811,270. In November the shipments were $1,064,634, and in December $1,361,155. The United States continues to be the best customer, and during December took $1,103,043. Australia was also a good buyer, taking $151,459, while England took $15,042. In December the shipments abroad of chemical pulp amounted to $428,164, as compared with $321,128 in November. The total exportation for the last calendar year was $4,383,276, and in mechanical pulp, $4,509,261. The export for December in the latter was $457,883 and in November $455,280.

Book and writing paper, owing to the war tax on raw material, has ascended in price since the last report. Manufacturers feel that they have, during the past few months, absorbed all the increases that they can, and when the extra duty of seven and a half per cent on ingredients from the United States and five per cent from England was imposed, the situation became too serious for the producers to bear alone. All grades, with the exception of bonds, have been advanced ten cents per hundred pounds. Bonds have been augmented by twenty-five cents per hundred pounds for white and fifty cents for colored, the raise going into effect on March 1st. The increase figures out to from two or four per cent on all papers selling up to seven cents, and on the higher grades of writing, ledger and bond the advance has been proportionate. There has been some talk of coating mills, and envelope manufacturers as well as papeterie makers, increasing their figure, due to the stiffer price they are paying for raw stock, but while some are in favor of a jump, it is felt that prices could be better advanced some other time. Book and writing men declare that March business has loomed up livelier than expected, and mills are now running a little more fully than they have since the first of the year.

One leading manufacturer says that the increase is so small that they will have to take care of the advance on envelopes, pads, etc. On grease proof, glassine, onion skin, parchments, parchmyns and other lines, which are imported into Canada, the exporters, in most cases, have reduced prices so that Canadian houses will not have to pay any more. The paper jobbing business is fair, but could stand a little more life and expansion. It is hoped that with the advent of spring and warmer weather things in many avenues of trade will become brighter.

There is not much change in the ground wood and sulphite situation, and prices remain about the same. In rags and paper stocks there is a better demand for mixed papers and folded news, while book stock is slackening off. Hard and soft white cuttings are rather quiet. Local plants have started again, which is a very good sign, but it is not known how long they will be working. Every one in the trade believes that as soon as Easter is over a very fair indication will be given of how business in the paper line is going to shape up for the summer, but it is expected that conditions will be far from as good as last season.

Quotations, f.o.b. Toronto, are:—

Paper.

News (rolls), $1.90 to $2.00 at mill, in carload lots.
News (sheets), $2.05 to $2.15 at mill, in carload lots.
Book papers (carload), No. 3, 4.00c to 4.25c.
Book papers (ton lots), 4.25c to 5.75c.
Book papers (carload), No. 2, 4.50c.
Book papers (ton lots), No. 2, 4.75c to 5.50c.
Book papers (carload) No. 1, 5.00c to 5.50c.
Book papers (ton lots), No. 1, 5.50c up.
Sulphite bond, 6½c. to 7½c.
Writings, 4½c up.
Grey Browns, $2.35 to $2.75.
Fibre, $3.35 to $4.00
Manila, B., $2.85 to $3.25.
Manila, No. 2, $3.10 to $3.50.
Manila, No. 1, $3.35 to $4.00.
Unglazed Kraft, $3.90 to $4.50.
Glazed Kraft $4.25 to $5.00.

Pulp.

Ground wood pulp (at mill), $16 to $17.
Ground wood, $21 to $24, delivered.
Sulphite (unbleached), $39 to $43 del. in Canada.
Sulphite (unbleached), $40 to $44, delivered in U.S.
Sulphite (bleached), $54 to $58.

Paper Stock.

No. 1 hard shavings, $2.05.
No. 1 soft white shavings, $1.70.
No. 1 mixed shavings, 50c.
White blanks, 97½c.
Heavy ledger stock, $1.50.
Ordinary ledger stock, $1.30.
No. 2 book stock, 50c.
No. 1 book stock, 75c.
No. 1 Manila envelope cuttings, $1.20.
No. 1 print Manilas, 65c.
Folded news, 32½c.
Over issues, 40c.
No. 1 cleaned mixed paper, 25c.
Old white cotton, $2.50 to $2.75.
No. 1 white shirt cuttings, $5.75 to $6.00.
Black overall cuttings, $1.70.
Thirds, blues, $1.50.
Black linings, $1.75.
New light flannelettes, $5.00.
Ordinary satinets, 95c.
Flock, $1.05.
Tailor rags, 90c.
Manila rope, 2c to 2½c.
No. 1 burlap bagging, 90c.

Quotations f.o.b. Montreal are:—

Book—News—Writing and Posters.

Roll News, $40 to $43 per ton for large orders, $45 to $50 per ton for small orders.
Ream News, $45 to $47 per ton for large orders, $50 to $60 per ton for small orders.

No. 1 Book, 5¼c to 6c per lb.
No. 2 Book, S.C., $4.50 to $4.75 in large quantities; $4.75 to $5.50 in small quantities.
No. 3 Book, M.F., $4.00 to $4.25 in large quantities; $4.40 to $4.50 in small quantities.
Writings, 5c to 7½c.
Sulphite Bond, 6½c to 8½c.
Writing Manila 5c.
Colored Posters 4c. to 5c. per lb.

Wrappings.

Grey Brown, per 100 lbs., car lots, $2.25 net; 5 tons $2.45; 2 tons, $2.55; 1 ton, $2.65; less, $2.75.
Red Brown, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, 3.15; less, $3.25.
B. Manila, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, $3.15; less, $3.25.
No. 2 Manila, car lots, $3.10; 5 tons, $3.20; 2 tons $3.30; 1 ton, $3.40; less, $3.50.
No. 1 Manila, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton, $3.65; less $3.75.
Kraft, $3.75 to $5.00.
Fibre, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton $3.65; less $3.75.
Fibre, $2.75 to $3.50.
Manila, B., $2.50 to $3.25.

On large orders to the jobbing trade some manufacturers are quoting 10 per cent off the above prices on wrapping.

Pulp.

Sulphite easy bleaching, $43 to $45 per ton.
News quality, $41 to $42 per ton.
Bleached sulphite, $54 to $59 per ton.
Kraft pulp, $3.60 to $4.00.
Ground wood, No. 2, $22 to $24, delivered United States.
Ground wood, No. 1, $15 to $16.

NEW YORK MARKETS

(Special to Pulp and Paper Magazine).
New York, March 12, 1915.

The demand for ground wood pulp has been hampered by favorable water supplies at paper manufacturing districts. In the localities where ice has prevented the use of pulp mills, there has been a small demand and prices for all grades have been fairly well maintained. There is some overproduction of ground wood at present as the demand is not sufficient to take up all the output of the mills selling this stock. It was reported that some of the ground wood mills had not been able to run to capacity on account of the cold weather. Prices are about $16 a ton at the pulp mills for No. 1 and about $14.50 for No. 2.

The sulphite and other chemical pulp markets have been dull and featureless. There is a considerable supply of pulp coming into the domestic ports all the time from Germany, some from Scandinavian mills. Prices are essentially unchanged. It is reported that there are unusually heavy supplies of foreign chemical pulp on the docks.

The demand for rags and bagging has shown some improvement and prices are stiffening.

Old waste papers have been in very poor demand in most grades. Shavings are lower in price than they have been during the last year. It was reported that some soft white shavings of good quality have sold as low as 1.70 cents a pound. Old manillas have not been very active and the price has been unsatisfactory to dealers and packers. Mixed papers have been moving a little better and the price has advanced about three cents a hundred, but packers are still suffering losses on their shipments of this grade. Flat stock moved along steadily at firm values which average from 85 cents to $1.00 a hundred.

There has been a slight improvement in the market for all grades of paper during the interval. The demand for newsprint has been aided by the increased advertising of spring goods. Transient orders have been rather dull and most activity has been in contract shipment. The demand for fine papers has been fairly good and prices are firm. Book paper has moved along better than at any time in the last few months. The cause for the improvement in this grade is the renewal of catalogue orders. Business on contract with periodical publishers has not been very satisfactory for the last two months and there has been but little improvement in this field during the past two weeks. Tissues have been rather dull and weak. White tissue of high commercial grades have been selling at 40 cents a ream in the past two weeks. Wrapping paper mills have been running on uncertain time during the interval and have not been encouraged very much by the spotty flow of orders. The market is rather weak as far as price is concerned as a number of mills which raised their prices a few months ago have gone back to the old level that prevailed before the war began. Manufacturers are hopeful and look for better business in the near future. Utter demoralization prevails in the board market. Prices are very weak and the demand is subnormal. Manufacturers are pessimistic and do not anticipate much improvement before the end of this month.

(Special to Pulp and Paper Magazine.)

Pulps.

Ground Wood, No. 1, $19 to $23, delivered.
Ground Wood, No. 2, $17.50 to $20, delivered.
Unbleached Sulphite, dom., 2.02½ to 2.25, delivered
Unbleached Sulphite, imptd., 1.80c to 1.95c, ex dock, New York.
Bleached Sulphite, domestic, 2.05c, delivered.
Bleached Sulphite, impt., 2.75c to 2.90c, ex dock, N.Y.
Easy Bleaching, impt., 2.05c to 2.15c, ex dock, N.Y.
Unbleached sulphate, impt., 1.95c to 2.05c ex dock N.Y.
Bleached sulphate, impt., 2.80c to 3.00c, ex dock, N.Y.
Kraft Pulp, 1.95c to 2.05c, ex dock, New York.

Paper.

Quotations unchanged for all grades of paper:—
News, rolls, transient business, $1.95 to $2.05 f.o.b
News, rolls, contract renewals, $2.05, f.o.b.
News, side runs, 1.95 to 2.00, f.o.b., New York.
News, sheets, 2.20 to 2.30 f.o.b. New York.
Book papers, car lots, M.F.S., $3.75 to $3.90 f.o.b.
Writing paper, superfine, 13¾c to 17c, del. east of Miss. River.
Writing paper, extra fine, 11c del. east Miss R.
Writing paper, No. 1, fine, 9c, del. east Miss. River.
Writing paper, No. 2, fine, 8c del. east Miss. River.
Writing paper, engine sized,5c to 8c, east Miss. R.
Bond paper, 5½c to 24c, delivered east of Miss. R.
Ledger paper, 8½c to 30c, delivered east of Miss. R.
Linen paper, 8c to 18c, delivered east of Miss. River.
Manila jute, 4¾c to 5¼c, delivered.
Manila, wood, 2.65c to 3.25c, delivered.
Kraft, No. 1, $3.60 to $4.00 f.o.b. New York.
Kraft, No. 2, $3.35 to $3.50 f.o.b. New York.
Boxboards, news, $23 per ton, delivered.
Wood pulp board, $40 per ton, delivered.
Boxboards, straw, $21 per ton, delivered.
Boxboards, chip, $22 per ton, delivered.
Tissue, fourdrinier, 50c f.o.b. New York.
Tissue, white, cylinder, 40c to 42½c, f.o.b. New York.

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Conditions to Improve

The newsprint industry, of which Canada is so justly proud as a source of income from foreign countries of upwards of eleven million dollars per annum, is in a most peculiar situation at the present time.

It has reached bottom.

While some mills are able to make money under existing conditions, a great many others are barely able to get along. Production is going ahead fairly steadily, and there is little difficulty about deliveries, but there have been cuts in prices which allow some mills to exist, and no more. It may be that the market will go slightly lower. But generally speaking, it has reached bottom.

In general, sales have been made on a lower basis, and never before have there been so many conditions demanded of manufacturers and so many considerations allowed to purchasers. Newsprint makers have little more to give. Lower prices would mean cutting into the vitals of their business, and many simply will not go further into their profits for the purpose of keeping stocks on the move. General conditions for the manufacturer must come up if business is to be prosecuted in a properly remunerative manner.

Leading manufacturers say that good times are on the way. Five paper manufacturers, two in Canada and three in the United States, whose opinions carry weight everywhere, have recently made independent statements to the effect that next fall or at least, the close of the war, will see America on the threshold of new industrial activity and economic well-being. The United States and Canada are going to get war orders, they argue, if the war keeps on. If, as they are inclined to believe, the war ends before snow flies again, then the work of reconstruction of battered Europe is going to make America a veritable hive of industry. One of the paper men mentioned, who has been an outstanding personality in the industry for many years, and who incidentally has seen several wars, has noted that every conflict, deplorable as it may be in itself, has proven an unusual stimulus to industry.

A leading Canadian writer in the field of economics and industry points out that not only must the war end in the fall, but that on account of the destruction of the manufacturing districts in Europe, which in the case of France are situated in the north, in the case of Russia in the west, let alone the demoralization all over Belgium and Germany, industries in America must flourish.

It is not pleasant to think of the demolition of wealth which it has taken generations of the most intensive labor to create, nor do we here on this side of the Atlantic glory in the prospect that another nation's misfortune is to be the cause of our own commercial upbuilding. It would seem, however, that with war orders, while the conflict endures, and with the demand for our products, notably those of the farm, after peace is signed, that we are to see better times. Quite recently, it has been estimated that the orders for shells, which will be distributed among about two hundred metal-working plants in Canada, will amount to [illegible] or about twice the annual cost of running the country.

Opinions from abroad would seem to corroborate the statement that America is to see a boom after the war. Charles Gide, the famous French economist, thinks that there will be an expansion, mainly through the fact that a victory for the Allies will be the best possible advertisement for the goods of the Allies—"an advertisement, the results of which are almost beyond calculation."

Of course, such forecasts as these must be tempered with reserve similar to that exhibited by Mr. Lloyd George, who in presenting his war budget in November, pointed out that while British manufacturers might find a period of four or five years of artificial stimulus due to the abnormal conditions, it would probably be found that the period of expansion would be followed by the most serious industrial situation which the nation had ever had to face, as capital would be exhausted and customers crippled and their purchasing powers destroyed.

The Cabinet Minister in Ottawa who is quoted as having predicted for Canada a few months of unusual activity after the war, followed by a period of quietness of several years' duration, realized, as doubtless few do, that a war which involves the destruction of billions of dollars, must be paid for, and that while those on the scene of conflict suffer most, the loss must necessarily be met by all the world.

The conditions in Canada for the future would seem to be, then, prosperity, followed by a period of slow progress. If we are to make the most of the former and to succeed best in the latter, we can well afford to follow a plan of solid earnest development of industry. There is much of truth in the recent statement of a prominent American importer, that if Britain and France are to enter into the commercial life of the world as Germany has done in the past, they must be content to work as hard as Germany has done in the upbuilding of her marvellous foreign trade.

Just how this would work out in the pulp and paper industry it will take time to discover. Manufacturers are most interested in getting out of the present "deadlock." About a year hence, when, as hoped and expected, conditions will have righted themselves, there will be an opening for some excellent constructive work among the our pulp and paper enterprises.

A cheerful note in the world of Canadian finance is the fact that money is plentiful. In New York it has been present in sufficient quantities to raise the price of stocks considerably, and to bring the general level of the exchange up to a higher point than any other since the resumption of trading. In Canada, business deposits in banks have picked up by four millions in February. Bank note circulation shows an increase of about half a million dollars in the month, which constitutes practically normal conditions. Savings deposits continue to increase at the rate of about four million dollars per month. There are now on savings deposit 671 millions of dollars, which exceeds last year's figures by about 31 millions.

Call loans, both domestic and abroad, have been increased about 1½ millions, and bank clearings are improved. The word from the West is that seeding is going to be heavy. It is also stated that business in the West is getting down to a solid basis, collections are better and financial obligations more respected than they were in boom times.

Alcohol and Efficiency

"Grape Juice Daniels," Secretary of the United States Navy Department, who, for his policy of enforcing total abstinence among men and officers in the Republic's battleships, has had ridicule and abuse heaped upon him ,must feel a degree of satisfaction which comes to but few men in their lifetime. He has been called "granny" and "pink tea artist," and has had attached to him numerous other epithets which assail the manliness of a man. He has been accused of limiting liberties and making the arduous life in the navy almost unbearable. But within eight months he has seen abstinence enforced in every army in Europe, and, moreover, he has seen the vast vodka trade of Russia entirely swept away. A government monopoly which has heretofore brought tens of millions of dollars annually into the Russian exchequer has simply disappeared, and Russia is rejoicing in the release from what has well been called a blighting curse. France has seen a remarkable change in its manhood since the war put a more or less effective block to the consumption of absinthe.

In America the crusade against the liquor habit for the purpose of increasing efficiency is taking strong hold. "You can not drink steadily and be fully efficient," employers are saying to their men. About the middle of last month in Appleton, Wis., there was held a series of meetings, under the auspices of the "efficiency institute" at which the scientific facts with regard to alcohol and welfare were brought forward. One evening was set aside as "'industrial night," and in the big armory of the city were gathered upwards of two thousand people, of whom, it was estimated, three quarters were men from the mills, which play such an important part in the pulp and paper industry of the United States. A few sentences from one of the best of the five-minute addresses, that by Mr. Gebhardt G. Kamps, head of the welfare department of the Riverside Paper and Fibre Company, will show the trend of the thought of the meeting.

"The drink habit is without a doubt the most troublesome and most unsatisfactory condition in our industries, because it has no aim and uplifting or bettering the condition of man, but has every qualification of a destroyer. This being the case, a man with the habit is considered an inefficient employee. Science has proven this to be a fact, then certainly the drink habit must be contrary to laws governing efficiency.

"The manufacturer views the subject of temperance as the best means of promoting efficiency, for efficiency means greater production and better quality, to him. The manufacturer further realizes that to talk prohibition to his employees would cause dissension, because they feel that we are encroaching on their personal liberties. We advise total abstinence, for we know positively that this would be a most beneficial step towards remedying intemperance and obtaining results in the highest degree of efficiency, but we demand moderation.

"The employee recognizes the fact that temperance is one of the main issues to-day, which is being harped on so frequently by us. They are aware of the fact that we, under no condition, allow them to proceed with their duties, if they are in the least under the influence of alcohol.

"Further—through this course, we have been able to get at our men who have the habit of stopping in saloons for their eye-openers and fire extinguishers No. 6 size, before going to work at noon hour. The employee knows exactly where we stand on this score, such practices are absolutely forbidden and should a man enter our premises and we detect he is under the influence of liquor, we are very careful not to allow him to proceed with his work. We suspend him for the day, and on his return he is advised that a repetition of this nature means dismissal. The manufacturer knows that this type of man is a hindrance to his producing elements and further understands that he is a good victim for accidents, which fact again proves that the Power of Efficiency is lessened by the Drink Habit.

"Seventy per cent of accidents are traceable to drinking men, and this on account of their inability to foresee the points of danger, as rapidly as a man free from this habit. Accidents are expensive to both manufacturer as well as the injured. The manufacturers' accident insurance rate is based on hazards of his establishement, and where accidents occur frequently the rate is based in proportion. The injured receives but 65 per cent of the weekly wage in case of disability after the seventh day, therefore losing 35 per cent of his weekly earnings and all of the wage he would have earned the first seven days.

These facts being known, there is but one alternative and that to become total abstainers in order to increase your efficiency for the manufacturer and to eliminate yourself from accidents for the sake of your families and if you cannot master the situation on this score at least, become a more moderate drinker."

One of the points made by Mr. Kamps, that safety in pulp and paper mills is increased by the banishing of "tippling," was quite recently brought out by a leading Canadian manufacturer, who in discussing ways and means in connection with the new Papermakers Safety Association just incorporated in Ontario said: "We put on our best safety appliance when we got the license of the grog shop across the road from the mill taken away."

It is one thing to interfere with a man's liberties and it is a vastly different thing to assist him to be efficient. Along the latter lines a good vigorous movement will always be welcome, and certainly the pulp and paper mills of Canada will give it a hearty reception.

LETTERS TO BE TAXED APRIL 1st.

The Post Office Department, Ottawa, has made the following announcement re the new war tax:—"Re one cent war tax on letters and post cards mailed in Canada for delivery in Canada, United States or Mexico, and on letters mailed in Canada for delivery in the United Kingdom and British Possessions generally and wherever the two-cent rate applies.

A war tax of one cent has been imposed on each letter and postcard mailed in Canada for delivery in Canada, the United States or Mexico, and on each letter mailed in Canada for delivery in the United Kingdom and British Possessions generally, and wherever the two-cent rate applies, to become effective on and from the 15th April, 1915.

This War Tax is to be prepaid by the senders by means of a War Stamp for sale by Postmasters and other postage stamp vendors.

Wherever possible, stamps on which the word "War Tax" have been printed should be used for prepayment of the War Tax, but should ordinary postage stamps be used for this purpose, they will be accepted.

This War Stamp or additional Stamp for war purposes should be affixed to the upper right hand portion of the address side of the envelope or postcard, close to the regular postage, so that it may be readily cancelled at the same time as the postage.

In the event of failure on the part of the sender through oversight or negligence to prepay the war tax on each letter or postcard above specified, such a letter or postcard will be sent immediately to the nearest Branch Dead Letter Office.

It is essential that postage on all classes of mail matter should be prepaid by means of ordinary postage stamps. The War Tax stamp will not be accepted in any case for the prepayment of postage."

WOODPULP IN THE CANADIAN NORTHWEST.

In a report on industrial conditions in the northwestern Provinces of Canada, published as a supplement to "Commerce Reports," U.S. Consul General Frank Dillingham makes mention of the woodpulp industry in the Kenora district, saying:

The big Norman Power Dam, situated in the town of Kenora, which was purchased last year by the Backus-Brooks interests of Minneapolis, with a view to utilizing the power, or a portion of it, for the operation of a large pulp mill, has not as yet been further developed. It is generally understood, however, that the preliminary construction of the mill will be started in the spring of 1915, as the Ontario Government has come to some loan arrangement with the owners by which the Government is to supply a certain amount of money for the purpose.

At Dryden, Ont., 125 miles east of Kenora, the pulp mill operated by the Dryden Timber & Power Co., has considerably increased its exports of chemical pulp to the United States during the past year. It has now an established market entirely American, and the demand has been so keen that it will necessitate enlarging the present manufacturing equipment. The supply of pulp timber, the water transportation facilities, and the vastness of the district present a field for profitable investment to pulp men. The central distributing point, though its advantage is partly offset by lack of competition in carrying railroads, has, back of it, to the north, a practically unopened country, teeming with pulp products, which has not as yet been even timber surveyed.

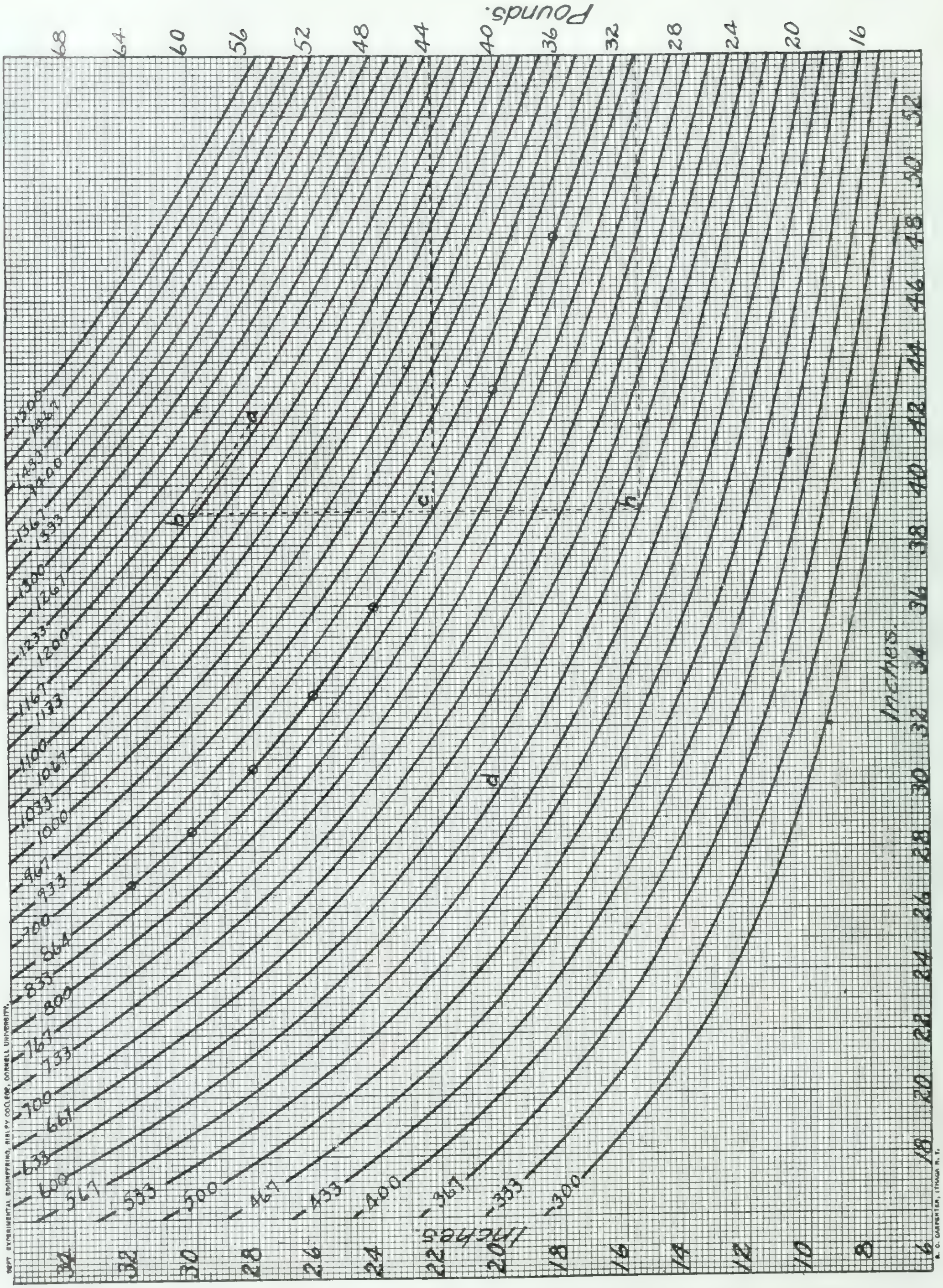

Fig. 1—Curves for finding the equivalent pounds per ream when changing the size of the sheet

GRAPHICAL METHOD FOR FINDING THE EQUIVALENT WEIGHT PER REAM

By EDWARD J. TRIMBEY, M.E.

(Special to Pulp and Paper Magazine)

When two or more systems or bases are used for expressing the same property it is often desirable to convert the value from one basis to another. Considerable time and effort can be saved by the use of conversion tables, and where extreme accuracy is not required the work can often be further simplified by the use of graphic charts.

In the paper trade there are many bases for expressing the "weight" of the sheet. Not only do the sizes of the sheet vary widely, but there are different numbers of sheets in a ream. For Newsprint we have the weight expressed as the pounds per ream of 500 sheets 24" by 36"; bag papers are generally weighed on this basis also, while for wrapping papers the 24" by 36" sheet is used but only 480 sheets are taken for a ream. In the case of writings and book papers a great many different sizes of sheet are employed, and for comparing the weight of two papers when the weight per ream is for different sizes of sheet it is convenient to reduce both to the equivalent weight on the 24" by 36" basis.

It is not at all difficult to compute the equivalent weight of a sheet in terms of another size, the general formula being,—

$$\frac{\text{width of ``b'' x length of ``b'' x weight of ``a''}}{\text{width of ``a'' x length of ``a''}} = \text{weight of ``b''}.$$

where "a" is the sheet whose weight is known, and "b" the sheet whose weight is desired, the dimensions being expressed in inches and the weight in pounds per ream.

Another way of writing the formula, is,—

$$\frac{\text{square inches in sheet ``b'' x weight of ``a''}}{\text{square inches in sheet ``a''}} = \text{weight of ``b''}$$

Since a sheet 24" by 36" contains 864 square inches, if we wish to find the equivalent weight on the 24" by 36" basis we multiply the weight on the given basis by 864 and divide by the number of square inches in the given sheet.

It takes time to make these computations however and if much of this work has to be done it will be quite a convenience to make up tables giving the corresponding weight on the 24" by 36" basis for each weight of the given size of sheet. This means a separate table, or at least separate column, for each size of sheet.

The accompanying sheet of curves, Fig. 1, is designed to take the place of all these tables and in compact form gives a means of not only determining the corresponding weight of any size of sheet on the 24" by 36" basis, but it can also be used to find the corresponding weight of any size of sheet on any other basis.

This group of curves consists of a family of hyperbolas in which each curve represents a certain number of square inches of area, this number being shown by the numbers entered on the body of the sheet at the left and along the top. The method of applying these curves to the solution of problems can best be shown by several examples.

Let us assume that we have a sheet weighing 60 pounds per ream of 500 sheets 28" by 42" and that we wish to find the equivalent weight on the 24" by 36" basis. Finding 28 on the left hand margin and projecting horizontally to the right until we cut the line marked 42 (shown at the bottom of the sheet), we find the intersection "a" to be between the curves marked 1167 and 1200 and about one-third of the distance above the 1167 curve. Keeping this relative distance between the 1167 and 1200 curves we project upward (as shown by the dotted line "ab") until we cut the line representing our given weight, 60 pounds, at "b" (the values for weight are shown at the right-hand side); we then project vertically downward from "b" until we cut the 864 curve at "c", and projecting horizontally to the right from "c" we find 44.1 pounds as the equivalent weight on the 24" by 36" basis.

If we had wished to find the equivalent weight on any other basis than the 24" by 36", say on the 20" by 30", it could have been found as easily. We would first have found the intersection of the 28" and 42" lines and have projected this intersection between the 1167 and the 1200 curves until we cut the 60 lb. line at "b" as before. Finding the intersection of 20" and 30" at "d" on the curve marked 600 we would project vertically downward from "b" until we cut the 600 curve at "h", and then projecting to the right horizontally from "h" we find 30.6 pounds which would be the weight per ream if the sheets were 20" by 30" instead of 28" by 42".

In the same way we can use these curves to convert any weight per ream on the 24" x 36" basis to the equivalent weight for any other size of sheet. Assume that we have paper which weighs 36 pounds per ream 24" by 36", what will be the weight per ream if cut 30" by 40"? Starting at the righ-hand margin with 36 lbs. we project horizontally to the left until we cut the 24" by 36" curve, or 864 square inches, then project vertically upward until we cut the curve which lies on the intersection of the 30" and 40" lines and projecting horizontally to the right from this intersection we find 50 pounds as the required weight.

Fig. 2 gives a means of graphically converting weights on the basis of 480 sheets per ream to the

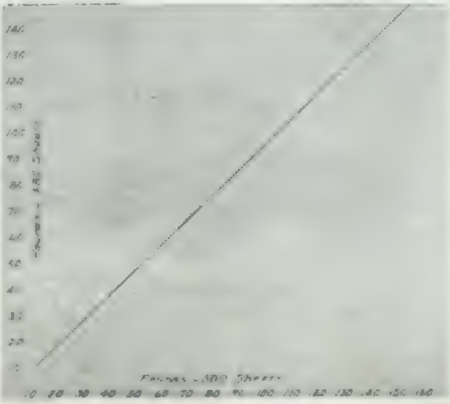

Fig. 2. Curve for finding the weight per ream when changing from the 480 sheet basis to the 500 sheet basis, or from the 500-sheet to the 480-sheet.

equivalent weight 500 sheets per ream, or from 500 to 480. The weight for 480 sheets is shown at the left-hand side and for 500 sheets at the bottom. Taking any given weight for 480 sheets on the left-hand side and projecting horizontally to intersect the curve and then vertically downward will give the equivalent weight for 500 sheets; or, starting at the bottom with the weight for 500 sheets and projecting vertically upward to intersect the curve and then horizontally to the left will give the equivalent weight for 480 sheets.

NOTES ON ACID PLANTS

By LEO SCHLICK, M.E., C.E., Consulting Engineer, Toronto, Ont.

(Special to Pulp and Paper Magazine.)

The heading "Notes on Acid Plants" will emphasize to the reader the impossibility of dealing with this intricate matter in every respect. However, I shall endeavor to give a review of the principal systems which have been adopted by chemical pulp mills.

At the outset, I should state that processes based upon electricity, fluorous acid, etc., have not yet found recognition in the circles of pulp makers. We, therefore, will not deal here with this interesting matter, nor with the numerous and often very clever acid processes other than the calcium-bisulphite process. Acid in the calcium-bisulphite process is a solution of sulphurous acid combined with a base. Acid is obtained by burning sulphur (S) or roasting pyrites (FeS_2) in closed chambers, vessels, stationary pans or rotary kilns to produce sulphur-dioxide and then combining this gas with a base. This base is generally calcium, magnesite or a mixture of both; and they find ready employment on account of their cheapness. Soda, however might be used just as well. We must make clear that the base, which is the cheapest f.o.b. the mill, is generally the best; which explains why so many mills though manufacturing similar pulp, have different systems. At the time of the erection of the plant the base, be it quick lime, lime stone, dolomite or marble, was found to be advantageous and thus was adopted.

The base of an acid having been the foundation for many an acid system must be recognized as having a large influence on the quality of the pulp. About this we will speak later on.

Sulphurous acid (H_2SO_3) is obtained by burning sulphur or roasting pyrites and is a solution of sulphur dioxide (SO_2) in water (H_2O). In recent years rotary kilns have been preferred for the burning of sulphur, whilst pyrites is roasted either in rotaries or in stationary closed chambers with or without agitators. It is evident that the generation of sulphur dioxide necessitates a certain amount of air. However, whilst the proper admittance of air is of utmost importance, of still larger consequence is it that every atom of sulphur should receive the two atoms of oxygen required. This will be clear when we consider that the conditions of combustion are not the same through the whole of the flame. Thus it happens that part of the sulphur or pyrites will receive too much air, whilst the rest has not sufficient. This is due to a lack of mixing capability of the kiln.

The amount of air required for the generation of sulphur dioxide is as follows:

Sulphur (S)=32 atomic weight.
Oxygen (O)=16 atomic weight.

$$S=2\times 0$$

32 grams of sulphur (S) require 32 grams of oxygen (O) which is called a "gram molecule" and has a volume of 22.3 litres.

One gram molecule of SO_2 has a volume of 22.3 litres. 100 litres of air contain theoretically 21 litres of oxygen.

$$32 : 22.3 = X : 15$$

X=21 grams of sulphur per 100 litres of air at O degrees and 760 millimetres pressure.

For every degree centigrade above zero, an expansion in the volume of $\frac{1}{273}$ has to be allowed for. If the generation of sulphur dioxide is not carefully attended to, serious difficulties in the manufacture might arise. Thus an excess of air will cause the generation of sulphur trioxide. In this case, not only is sulphur lost, but the formation of sulphuric acid (H_2SO_4) is brought about. Sulphur trioxide is formed as per

$$2\,S + 3\,O_2 \text{ ——— } 2\,SO_3$$

Before going into further details of the generation of sulphur dioxide, we will follow up the hypothesis about the various compounds the sulphur-dioxide is subject to, and which will demonstrate the importance of the base.

If we use calcium oxide as a base in connection with sulphur dioxide as the attacking agent, we obtain mono-sulphite in accordance with

$$CaO+SO_2=CaSO_3$$

Mono-sulphite as a crystal is soluble in water (1:800) contains 41 per cent of sulphur dioxide and when exposed to strong heat is separable into sulphuric acid and calcium sulphate. In the presence of sulphuric or hydrochloric acid the monosulphite is also affected again, as SO_2 is separated from the compound.

Monosulphite readily combines with an aqueous solution of sulphur dioxide as per

$$CaSO_3+H_2SO_3=Ca\ (HSO_3)_2$$

This compound, however, is to be regarded as very loose, considering that all the SO_2 without regard to its carrier the monosulphite is acting as free acid during the cooking process.

According to the inventor Tilghman and to Dr. Frank, the SO_2 combines with the oxygen of the incrustations of the wood, thus forming sulphurous acid, which in turn forms compounds with the organic matter and with calcium. (Professor Klason's theory differs somewhat herein). In order to prevent the pulp

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from becoming discolored at the end of the cooking process the presence of the base, which, as described above, is absolutely necessary, must be made certain of and the cook is to be finished before the calcium bound to the SO_2 has been transferred into neutral compounds.

The sulphuric acid having been formed by the influence of the SO_2 upon the incrustations of the wood during the cooking process combines with the organic matter to sulphonic acid. Sulphonic acid is an acid such as sulphuric acid, in which one atom H is replaced by a group.

As distinguished from sulphurous acid, sulphonic acids form easily soluble compounds with Ca and Baryt. Sulphonic acid and sulphuric acid force the SO_2 from its connection with calcium, that is to say, they decompose the monosulphite, causing a gaseous accumulation at the top of the digester. This accumulation is of sulphur dioxide. According to Ekman compounds of magnesia (being used in form of magnesite) instead of calcium do not spoil or influence the color of the pulp, on account of being soluble in water. This also applies to dolomite and explains why some of the manufacturers of Easy Bleaching prefer this material to lime stone.

Returning to the making of the sulphur dioxide and to the more or less inefficient mixing of oxygen and sulphur during the burning we will mention that Dr. Frank recognized this disadvantage some 20 years ago. Having found that a certain quantity of sulphur comes in contact with too much oxygen whilst the remainder is lacking its presence, he designed a special sulphur burner, which, working under pressure, receives the oxygen through nozzles, one of which is placed in the rear and a second in the front. Hereby whirls are formed which facilitate the combustion greatly. Burners of this kind being made of sheet steel and being provided with a water jacket, work very satisfactorily indeed, although the air compressors are noisy affairs. The efficiency and capacity of Dr. Frank's burner are very good. The formation of sublimate does not excessively occur when properly attended to. Its burning capacity is up to 3,000 kilograms of sulphur per 24 hours when working in connection with a proper sublimator.

Periodical charging of burners and the resulting surplus of oxygen cause the formation of trioxide, whilst the lack of sufficient oxygen thereafter forms sublimated sulphur. Although automatically-charged burners are theoretically an improvement upon the hand-charged system, variations in the quantity of acid manufactured cannot be eliminated, due to the fact that a certain amount of acid is required to fill the digesters at irregular intervals. Though sufficient reservoirs will be of considerable help in this respect, a certain amount of sublimate as well as sulphur trioxide has to be considered and means have to be provided to eliminate the consequences of their presence in the acid by the application of scrubbers, washers and combustion chambers.

In order to convert the sublimate into sulphur dioxide, special burners have been designed so as to catch the sublimate in pockets in which it is retained until its conversion is completed. Based upon the same idea of retaining, so-called "sublimators" have largely found employment. They are composed of an upright water-cooled cylinder fitted with a vertical partition and inlet and outlet on the top. The sublimate is retained on the bottom, thus being exposed to the passing hot gases from the burner; sublimators are placed directly behind the burner, and receive, therefore, the gases at a temperature of from 700 to 800 degrees Centigrade.

Sublimators must be so dimensioned as to fulfill their purpose thoroughly or they become more injurious than useful.

A well-dimensioned combustion chamber (acting also as a dust chamber) is to be regarded as the best remedy against incomplete combustion. It should have ample surface to allow for the depositing of sublimate readily and should prevent the passing gases from carrying the sublimate and dust with them into the coolers and the absorbers.

Another very effective means of cleaning the gases and freeing them from sulphuric acid is the application of a gas washer, the significance of which unfortunately has not been sufficiently recognized.

Gas washers are comprised of an upright cylinder fitted with lead lining in which showers clean the gas thoroughly. Another gas washer has effectively been used by Dr. Frank in the form of a closed water-filled tank, through which the passing gases were forced. If this water contains a small portion of sulphuric acid, the sulphuric acid contained in the gases will readily be attracted. The sulphuric acid carried by the gases is formed through the presence of sulphur trioxide and a small amount of moisture (vapor). It must be remembered that the presence of vapor can hardly be prevented, this being due to the atmosphere carrying such moisture, and so also does insufficiently dry sulphur or pyrites. Washers are generally placed between coolers and absorbers, and naturally offer a certain small resistance to the gases which has to be overcome.

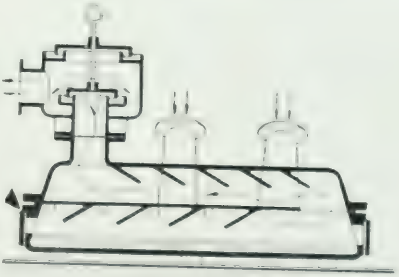

Fig. 1.

Before we go into the generation of sulphur dioxide from pyrites, we will deal with various designs of successful sulphur burners which have been and are still employed in the manufacture of sulphite pulp.

Burner as per illustration No. 1 is the type fitted with pockets so as to retain the sublimate as mentioned previously. It is charged through the front door as well as through the two inclined pipe branches, the latter being provided with swing covers, into which small windows are fitted. The gases generated in the bottom compartment are bound to change their direction when passing around the horizontal guide plate, and the sublimate having been caused by undue rapidity of burning are retained within the pockets formed by the rips with which the interior is provided. Thus the heat derived from the burning of the material is utilized for the elimination of the sublimate, in so far, of course, as the velocity of the gases within the burner will permit.

Here, as everywhere, if first class results are to be obtained much depends upon the amount of sulphur to be evaporated and converted. This accounts largely for the greater or smaller success of any installation of this kind. If too much is being asked from a burner it will readily swallow the sulphur fed into it, but cannot possibly produce a gas which is free from sublimate. It even often occurs that mills suffer from the presence of sublimate in the pulp, which not only means loss of raw material, but also loss of money and profits. These burners are installed in a large Bavarian mill, and are not cooled. From what I learned, they are subject to some overheating if overloaded.

Figure No. 2 represents one of the first burners especially designed for the manufacture of Mitscherlich pulp:

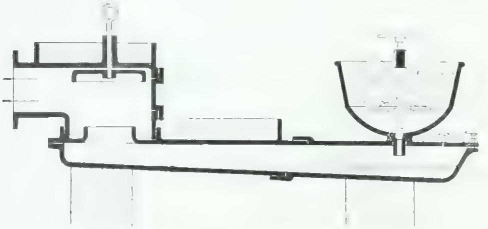

Fig. 2.

Mitscherlich, himself being very much occupied with the cooking process, towers and recovery end, did not pay much attention at the beginning of his experiments to the burners. He employed chambers provided with a strong plate on the top and another one on the bottom. His licensee and friend, Vogel, however, running a Mitscherlich mill in Zell, brought out the type illustrated above, which is to be regarded as a very ingenious invention. This burner, designed in 1882, embodies advanced features such as automatic charging, accurate adjustment of the air, and individual valve, so as to put the burner out of commission. The charging is not only automatic, but continuous, as the heat generated by the burning of the sulphur is utilized in pre-heating, and thus melting the sulphur. This pre-heating, which later on will be discussed in connection with pyrites, is very valuable, as part of the moisture contained in the sulphur is hereby evaporated. If not overloaded and if dimensioned so as to allow for proper combustion, that is, if of sufficient length, these burners have given entire satisfaction. They would be still more efficient if equipped with rips as shown in Figure 1. Their capacity runs up to 1½ tons and more of sulphur per 24 hours which, of course, is not excessive, but as they are, practically speaking, automatic, they have largely found the employment they deserved. The idea of automatic charging led to the design of flat burners, equipped with an arrangement as per Figure No. 3.

The charging device is comprised of an upright cylinder, provided with a door on the top, whilst the charge is kept in position by a flap valve. When the cylinder is to be filled, the cover is swung around, the sulphur is charged into the container, and the cover is left open until the sulphur is required. This gives the moisture in the sulphur a chance to evaporate. Thereafter the cover is tightly secured down to the flange and the flap valve is slowly opened, thus allowing the liquid sulphur to run slowly downward into the burner. This device not only prevents the entrance of excessive air, but allows to charge burners working under pressure. From the above we clearly see that the pioneers in sulphite making recognized fully the harm done through too much air, and when judging a burner, these principles should always be carefully considered.

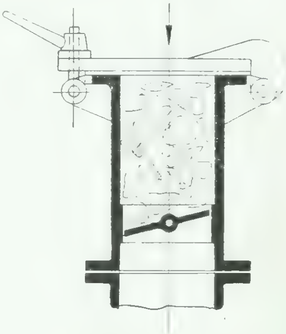

Fig. 3.

Figure No. 4 demonstrates an arrangement of burners working in conjunction with a large dust chamber.

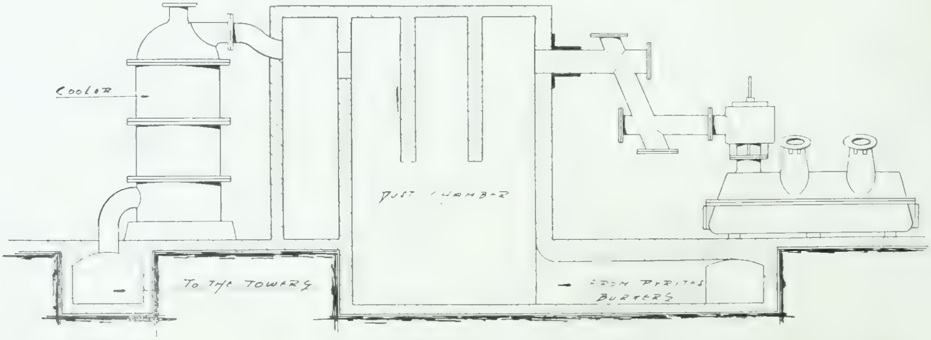

Fig. 4.

This dust chamber is arranged in connection with the pyrites burners. The gases, after having passed through a certain number of orifices and walls not fully shown in the sketch, pass into a series of vertical coolers and from there are led to the washers and the towers.

Combustion chambers as applied for the prevention of sublimate and apart from their usefulness as dust collectors, are to be regarded as an extended surface of the burner. Therefore where the capacity of an acid plant, is to be increased, the capacity of the burners can easily be increased by a large combustion chamber. No matter what its shape may be, it should fulfill the demands stated previously; that is, to retain as much sublimate as possible; to allow the arrested sublimate to be converted into sulphur dioxide, and to retain all or most of the dust contained in the gases.

If the burners are overloaded, or if it seems desirable to install fewer burners, as one has been accustomed to do in former years, the combustion chamber is to be provided with a secondary air inlet. In this case the combustion chamber embodies to a certain extent the old Mitscherlich idea, that is, the employment of chamotte chambers. When using this principle of conversion—to evaporate the sulphur forcibly in a burner and to continue and finish the conversion into SO_2 within the combustion chamber—stronger gases are obtained, as the latter have sufficient time to undergo the process of conversion. In other words, it is a slow burning process, the sulphur burner alone being the generator of evaporated sulphur.

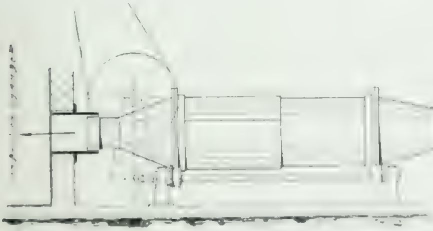

Fig.5.

The rotary sulphur burner, illustrated in Figure 5, has found due appreciation on this continent and in Europe, and without exception works in connection with a large combustion chamber. Burners of this kind consume up to six tons of sulphur or more per 24 hours. They rotate on two pairs of rolls, of which one pair is provided with flanges so as to keep the burner solidly in position. These burners are fed either by hand or by screw feed, and furnish a strong gas. Concerning the cooling of sulphur burners, it is to be said that water cooling, which was formerly favored, has been long since discarded as it wears out the burners. However, where conditions demand it, that is where there is not a sufficiently large combustion chamber, it still will be found in operation for the purpose of keeping the burners from getting red hot. This refers to flat stationary kilns only. Having previously been speaking about the dust contained in the gases we will mention that, according to the purity of the sulphur, same contains from ½ per cent to 4 per cent of impurities.

Sulphur (specific gravity 2.07) melts at 111.5 degrees Centigrade. At this temperature it has a yellow color, and is a thin fluid. At 150 degrees it becomes darker and thicker. At 250-260 degrees its appearance changes to black and its consistency increases. At 320 to 340 degrees it has a dark color and becomes thinner. The boiling point is reached at 448 degrees Centigrade. When boiling, brown, red vapor is vomited from the mass. Though sulphur is self-inflammable at 225 degrees, no sulphur dioxide is formed until the sulphur is ignited by means of a red hot bar.

Where pyrites (FeS_2) is easily to be procured, the generation of sulphur dioxide may cheaply be effected through its use.

As pyrites contains from 40 to 50 per cent, roughly speaking, of sulphur, and as the handling of the material and the roasting equipment require more attention than sulphur burning, the use of pyrites is only to be recommended if the amount of sulphur contained in same runs cheaper f.o.b. mill than commercial sulphur. There will remain from 3 per cent to 8 per cent of sulphur in the cinders. Special care has to be taken with the cinders, as if exposed to the rain they might poison the water in the neighborhood. As already demonstrated in Figure No. 4, a large dust chamber has to be provided, and also a scrubber right after the cooler. The coolers have to be arranged so as to allow for easy cleaning, as pyrites often causes trouble if the combustion is not carefully looked after, or if the kilns are not quite perfect.

The possibility of formation of harmful quantities of SO_3 is always present if the scrubbers have not sufficient over-capacity. If not, the SO_2 will form hard scales on the limestone in the towers and will form sulphates in the absorbers. Gases generated from pyrites carry iron, copper, antimony, lead, iron oxide, iron oxidul, zinc oxide, tellurinum, the dangerous selenium, thallium, etc., which have to be rendered harmless. This means that the installation of a pyrites roasting plant differs from the sulphur burning arrangement.

The generation of sulphur dioxide from pyrites is old, and dates back to 1835. The raw material is found in lumps of the smallest to so large a size that it requires breaking up by machine. In sizes from 2 to 3 inches diameter it is generally burned or roasted in kilns, being designed differently from those being fed with small-sized pyrites. In order to obtain the best results it is essential that the lumps should be of uniform size.

(To be Continued.)

PAPER CONDITIONS IN GERMANY.

The "Vossische Zeitung," a leading German daily, reports that the German paper industry is now traversing a crisis which has affected most grades. News had not participated in the upward movement and it was even feared that prices might decline. By the prolongation of the combination up to the end of 1916, a new element of strength has been imparted to the market. Almost all other classes (particularly wrapping and tissue) not only have risen, but are still further advancing. Makers are declining to quote for delivery beyond the coming weeks and months, maintaining that additional advances will yet be necessary.

Hence it is argued that paper prices must go up further, and that dealers will have to impress this upon their customers.

ORGANIZED ACCIDENT PREVENTION

By C. W. PRICE[1]

There is a widespread awakening over the country along the line of the prevention of accidents. This movement in its present organized form is only six or eight years old. Until recently information has not been available for manufacturers generally, regarding the reductions in accidents which have actually been accomplished, and regarding the ways and means of promoting safety which have been found most efficient by the companies which have made the largest reductions.

The Department of Labor reports that in the United States each twelve months there are about 34,000 men, women and children killed by accident; or to state it in other terms so that the mind can grasp these appalling figures, there is one human being killed every fifteen minutes of every twenty-four hours of the 365 days in a year. The report further states that there are 2,000,000 men, women and children injured by accident every year in the United States; or one person is injured every sixteen seconds of each twenty-four hour day. Not only are manufacturers awakening to the enormous waste involved, but the public in general is becoming tremendously concerned in regard to this appalling slaughter and in regard to the suffering and deprivation which comes to the homes and the families as a result.

The United States Steel Corporation was the pioneer in the present organized accident prevention movement and has without question made the largest contribution to the cause. The corporation began to study the question of accidents and to organize safety work on a systematic basis some ten years ago, but the most remarkable developments have come in the last five years. The officers of this corporation state that during the last ten years they have made a reduction in accidents in all their plants, of over 50 per cent. A recently published statement by this company shows that since 1906 there have been 8,801 men saved from serious injury and from death as a result of the safety campaign.

The Illinois Steel Company, which is a subsidiary company of the United States Steel Corporation, has been the leader of the safety movement in the Central West. In 1906 this company with its four or five plants and some 20,000 employees had a record of 43 per cent of its employees who were injured and lost over one day of time. The record of 1912 shows 12 p.c. injured and losing over one day of time. This company reports that a total reduction of 66 2-3 per cent has been made in serious injuries and deaths since 1900.

The Wisconsin Steel Company, which is a subsidiary company of the International Harvester Company, employing 1,300 men, since 1910 has made a reduction in accidents of 68 per cent.

The Jones and Laughlin Company, of Pittsburgh, has made a reduction in accidents of over 70 per cent.

About three and a half years ago the Chicago and Northwestern Railway Company began to promote safety along the lines which had been found so efficient in the Steel Corporation. A recent report of this company reveals the fact that comparing 1913 with 1910 a reduction of 35½ per cent in employees killed has been made, and a reduction of 25½ per cent in employees injured has been made. The number of passengers injured on this road has been reduced over 20 per cent. So immediate and striking has been the success of the safety work of the Northwestern Railway that within the last three years every great railroad in the United States has adopted the general plan of the Northwestern Railway and is now vigorously promoting safety. Out of the 244,000 miles of railroad in the United States nearly 200,000 is now operating under organized Safety. I recently received a letter from the Frisco Railroad which stated that during the first, eleven months of their campaign for safety they made a reduction in men killed of 33 per cent and of men injured 27 per cent.

The American Steel Foundries, which includes some eight large foundries making railroad castings, some three years ago were having about 85 eye injuries a month from chipping castings. They adopted a very efficient type of goggle for their chippers and as a result have reduced the number of eye injuries from 85 a month to less than 10 a month. They have also made large reductions in other accidents.

Harrison Brothers & Co., paint manufacturers in Philadelphia, began to promote safety vigorously something over a year ago. They report that during the first year they made a reduction of 68 per cent in accidents.

The most remarkable record which has been made in Wisconsin has been made by the Fairbanks-Morse Manufacturing Company, of Beloit, makers of gasoline engines. Comparing 1912 with 1906, this company has made a reduction in the number of days lost for which compensation would have to be paid (that is, the number of days over seven days) or 72 per cent.

The Chicago Street Railway Company has within the last year organized a safety department. I recently learned that whereas their traffic has increased 11 per cent during the last eight months they have made a reduction of 10 per cent in accidents.

I think that all of the men who have been actively engaged in this safety campaign over the country will agree that the experience in the United States during the last five years has demonstrated beyond the shadow of a doubt that it is possible to reduce by one-half the number of days lost by accident, and it is possible to prevent from 50 to 75 per cent of the serious injuries and deaths. Assuming this to be true let us look back a moment to the 34,000 deaths and the 2,000,000 injuries in the United States which are reported by the Department of Labor. A reduction of one-half in days lost from injury would mean an enormous saving in suffering, and an enormous saving in wages, to say nothing of the gain in comforts and opportunities to the families in ways that cannot be computed.

Out of the five years' experience in the various industries which have made the largest reductions in accidents has come this striking fact, and this fact is agreed to by practically all of the safety experts; that not more than one-third of the reductions which have actually been made have been accomplished through the use of safeguards or any mechanical equipment, while two-thirds of the reductions which have been made have been accomplished largely through organization and through education, in short, through reaching the workmen and securing their co-operation.

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[1] In "Paper Trade Journal."

The Statistical Department of the Industrial Commission of Wisconsin has recently made up a chart showing causes of accidents in the industries of the State—that is, accidents which caused disability of over seven days or resulted in death. This chart shows 7,900 accidents which occurred from September 1, 1911, to November 1, 1912, a period of thirteen months. Two thousand five hundred accidents occurred on machines and machine parts; that is, occurred at points where it might be possible to use a guard and to prevent the accident. However, it goes without saying that all of these accidents could not have been prevented by the use of guards. Five thousand and four hundred out of the 7,900 accidents occurred in ways where it is almost impossible to use any kind of a mechanical safeguard. A large number of accidents were caused by hot metals. Another group of accidents were caused by men being hit by edges, by fixed and moved objects, by objects falling from piles, etc. Another large group of accidents came under the head of "falls"—down stairs, from ladders, into excavations, etc. Slipping and stumbling caused many accidents. A considerable number of men were injured in handling various heavy objects and in dropping heavy objects. The largest number of injuries came from handling various kinds of tools.

The experience of all men who have studied accident prevention emphasizes the point that accidents similar to these 5,400 accidents can be prevented only by reaching the workman on the job, by instructing him in regard to how accidents happen and the part which we must do in their prevention—a part which is beyond the power of the employer to do. A recent report of the Interstate Commerce Commission contains a statement to the effect that 74 per cent of the railroad accidents in the United States during the past year resulted from violation of simple rules of safety.

I do not need to dwell upon the importance of building safeguards to cover various points of danger on machines. Practically all manufacturers are now familiar with this phase of safety work and appreciate its importance. In Wisconsin, for instance, during the last year there have been more guards built by manufacturers than during any previous five years in the history of the state. Already we are beginning to realize results. During the months of April, May, June and July of 1913 there was a reduction of 25.8 per cent in machine accidents in Wisconsin. Comparing 1912 with the year 1907 a reduction of 50 per cent has been made in the number of persons injured and killed in the entire state, and the indications now are that very substantial increases will be made over this record during the next two years.

It goes without saying that unless the employer has done considerable work along the line of covering points of danger with guards he is not in position to ask his workmen to co-operate in promoting safety. He must first show his own good intentions by spending the money and doing what he can to protect the men. The experience of the companies which have done the most systematic work in accident prevention has demonstrated that practically every point of danger on machines can be covered by a simple and effective guard which will prevent the men from being accidentally injured. The experience of these companies has revealed the fact that practically all of the best guards

Showing the Dangers of Weak Scaffolds.

are simple, inexpensive, and are designed and made by experienced foremen and machinists who are close to the work and who can design guards which will be adapted to the situation.

Our study of accidents in Wisconsin has brought home to us in the most striking way, how, until recently, serious accidents and deaths were occurring every few days which might have been prevented by some simple and inexpensive guard. For instance, one manufacturer protested to the commission against an order requiring that a set screw be removed or covered on a line shaft ten feet from the floor. The commission replied that our records showed that accidents happened at such points, but before the letter reached the man, or at least before he reached the set screw, one of his best men was caught on the set screw and whipped to death. An expenditure of 25 cents would easily have made that accident impossible. Recently a boy in one of the factories went up a ladder and walked across a platform which was dark, and ran into a large belt and was swept around the pulley and killed. Three or four old fence boards nailed together and placed in front of the belt would have prevented this accident. This crude guard would have cost almost nothing except a few minutes' time.

One goggle spattered by babbitt, the other broken by chip of concrete.

One of the factories having a large number of men working in the foundry at one time had thirty men off with burned feet. On the recommendation of the commission they adopted the plan of furnishing their foundrymen with moulders' gaiter shoes at cost. At the end of six months they reported that they had made a reduction in the burns to foundrymen of 85 per cent.

I might go on to enumerate dozens of similar instances, but it is unnecessary. Every manufacturer who has made a study of accidents in his plant is fully alive to the necessity of covering every point of danger with a guard, and when every point of danger which can be covered by a guard has been covered, then only one-third of the hazard has been taken off, while two-thirds still remains to be provided for by reaching the men on the job.

I had the privilege recently, at the second annual meeting of the National Council for Industrial Safety, which met in New York in October, of spending three days with some 150 expert safety men who are connected with large companies which have done successful safety work. We conducted a series of round-tables at which we exchanged our experiences in an informal way. I found that we all practically agreed on the essential points of the ways and means of organizing safety in the plants and of reaching the workmen.

I wish to outline briefly the form of safety organization which has been adopted in practically all the manufacturing plants. I shall include only those features which are considered indispensable to secure good results.

1.—It goes without saying that the men at the top—the owner of the business and the manager—must be in sympathy with the movement and must get back of it; and, as stated before, must have convinced the workmen of their own intentions by visible signs.

2.—The next step is to appoint what is called a "Central Committee," composed of the superintendent as chairman, and four or five high grade men in whom the owner of the business has confidence and in whom the foreman and workmen have confidence. The general management of the safety work is placed in the hands of this committee and all important matters are referred to it for decision.

3.—Practically all plants have found it necessary to appoint one man whom they call a safety inspector. In larger plants he gives his entire time to the work. In smaller plants he may give only a few hours each day to the work. The safety inspector acts as the secretary of the Central Committee and looks after all the details of inspection, all reports, and keeps in touch with the various committees in the shop. In other words he attends to the details which busy superintendents and foreman cannot and will not attend to.

4.—It has been found indispensable to have each forman make an inspection of his department, say once a week, and submit to the Central Committee a written report regarding the conditions. This plan places a certain definite responsibility upon each foreman and gives him an active part in the safety campaign. Unless he is given a part to do he is apt not to take an active interest.

5.—In the majority of plants the superintendent holds a meeting with his foreman at least once a month for the consideration of safety. The superintendent presides at these meetings and the safety inspector acts as secretary. A number of accidents which have ocurred during the month are discussed and ways and means are suggested for their prevention. A very important and fruitful subject for discussion is the ways and means of reaching the workmen. It is always found that certain foremen are more successful along this line than others, and their suggestions serve to help and encourage the others. One superintendent told me that in one hour's time each month, with his foremen gathered together, he could do more to line them up and keep them interested and enthusiastic than by going to them individually every day in the month.

6.—The most important feature of organizing safety work has been workmen's inspecting committees. In each department three rank and file workmen are appointed to serve one, two and three months, and are authorized and encouraged to make a thorough inspection of their department once a week, or at least once a month. In many plants they also investigate serious accidents. The report of these committees are always made in writing and are sent to their immediate foremen. The foremen attend to the majority of suggestions because they usually cover minor points of danger, and especially of careless practice. The complete report with the points which have been attended to checked off, is then sent to the Central Committee.

I have made a careful investigation of a large number of plants in which workmen's committees have been appointed, and in every case they have been successful and a surprising awakening of interest among the workmen has immediately resulted. When workmen are given responsibility and an active part to do, they feel that they have been recognized, and they at once take a new interest and a new attitude towards safety work. The experience of all factories with which I am familiar reveals the fact that from 90 to 95 per cent of the suggestions which these committees make are practical and are accepted by the company. As the work progresses the workmen's committees more and more report cases of carelessness and ignorance on the part of the workmen, and report fewer and fewer points of danger to be covered with guards. The 500 workmen on the committees of the Chicago and Northwestern Railway have reported, during the past three years, over 6,000 points of danger. I recently learned that all but about 200 of these suggestions have been accepted by the officers of the road.

In the work of inspecting their department and in investigating their accidents the men learn what the superintendents and foremen cannot tell them and make them believe, namely: that two-thirds of the accidents are beyond the power of the employer or the foreman to prevent and must be prevented by the active co-operation of the workmen. When the workmen on these committees become interested and become informed in regard to the causes of accidents through their experience, they become the best teachers and boosters in safety among the workmen, and can do very much to convince the workmen of the honest attitude of the employer, and especially in regard to the obligation of the workmen.

In organizing a small plant, say of 50 to 300 employees, the same fundamental principles apply as have been outlined for a large plant. While the features of the plan which include the superintendent and foremen could be simplified, and in many cases should be simplified, the committees of the workmen are the one indispensable feature which should be retained. The small plant can be organized in exactly the same way and just as successfully as one department in a large plant. This safety organization could be just as successfully adapted to a mine as to a factory.

In every plant the instruction of workmen, especially new men and non-English speaking men, in regard to danger, is made a very prominent feature of the safety work. So important is this considered that in some of the larger companies which employ a large number of non-English speaking men, an interpreter is employed who devotes his whole time to going among the new men and talking to them in regard to what the company is doing to protect the men, the part which the workmen are performing, and the dangers of the particular work which the man is about to take up. In this work of instruction, bulletin boards, books of rules, and bulletins, signs, safety lectures, moving pictures, calendars in the homes, have all been found valuable in keeping the safety idea uppermost in the minds of the workmen and in instructing them in regard to what they can do to protect themselves.

The Illinois Steel Company has adopted the plan in all of its plants, of giving some little token, such as a watch charm or pocket comb, to each workman in whose department no accident had occurred which caused a disability of over one day or over seven days. The plan has brought surprising results, because the workmen feel that they have been recognized and rewarded for the part which they did in making the record for the department.

The introduction of the safety movement into a plant does not mean the addition of more red tape or the imposition of a cumbersome system which will become a burden, but it means just what a manufacturing organization means—a systematic and orderly and efficient way of taking care of a difficult problem which has hitherto not been taken care of in a thorough manner. It means that a new force has been introduced into the plant which will keep up the interest and enthusiasm. During the last year the majority of large industries in Wisconsin have worked out safety organizations, and in every case there has resulted an immediate awakening of interest and a reduction of accidents within the first few months. I recently took the records of fifteen companies in the State which had adopted safety organizations and found that for the months of July and August, 1913, they had reported 40 per cent fewer days lost on account of injury than for the corresponding months in 1912. While these figures are only tentative they are a fair indication of what may be accomplished.

One of the most encouraging features of the whole campaign of organized safety work is that when once the manufacturer organizes his plant and secures the results he never goes back to the old methods, but in every case goes forward with increasing interest.

Safety Trophy Shield.—Twelve calender rolls. Name of winning mill inscribed on roll for each respective month.

I think the rapid progress which the safety movement is now making in the United States is largely attributable to the fact that manufacturers are learning of the remarkable results which have been secured in various plants by systematic efforts, and are becoming familiar with the details of safety organization. In every plant with which I am familiar where systematic safety work has been done, it has resulted in an improved manufacturing organization and in every case has resulted in a very substantial saving in money. Judging from my investigations, I should say that any company which will properly organize and promote safety may realize a dividend of at least 25 per cent on the money invested. I know of plants which are realizing 50 per cent on the investment.

It goes without saying that most manufacturers are humanitarian in their attitude toward their workmen and do not wish to see their workmen killed or injured, but if combined with this feeling there goes the realization that safety work turns out to be good business organization, we have two powerful motives, which combined, give us almost a certain assurance that within a few years all of the manufacturing plants in the United States will be doing efficient safety work and very large reductions will be made in the number of men, women and children who are killed and injured.

Density of Pulp and its Relation to the Beater

A correspondent of the "Papier Zeitung" quoted in "The Paper Trade Journal" states that the density of the pulp in its relation to the work of the beater is a very important point that has not been given sufficient attention in the theoretical operation of beater engines. To obtain a proper idea of the process of beating, he explains, the disintegration and the transport of the pulp by the roll must be considered separately, always with a view to the influence of the density of the pulp.

If the beater roll stands still, the contents of the trough will remain at rest. When the beater trough contains water only, the level of the latter will be of the same height everywhere; if, however, the trough contains pulp, the surface of the latter will, even after the roll has been stopped, be more or less inclined, and this inclination will be the greater the thicker the pulp, i. e., the greater the density. The density of the pulp (sp) will thus have an influence on the level of the pulp already while the machine is standing still. When the pulp is in motion it will undergo a friction against the walls of the trough, the wetted surface of which we shall indicate by the letter (u) and the length of which by the letter (I). This friction will differ according to the smaller or larger cross-section (F) of the pulp.

If we now attempt to move the pulp, for instance, by means of a paddle, it will rise higher at a rapid advance than at a slow advance—in other words, the resistances against the motion in the beater are in a certain relation to the velocity of the pulp (v). For overcoming these resistances there must be a drop (hw) in the level of the pulp circulating in the beater, and this drop depends on all the above-mentioned factors, and may be expressed by the following formula, which expresses all that has been said above:

$$hw = f.\ (sp \times u \times 1 \times FXv)$$

This value (hw) does not always correspond to the difference between the levels of the pulp in front and behind the roll, as the section of the passages through which the pulp has to flow is not everywhere the same. If, in particular, it be remembered that the bottom of the trough rises in front of the roll, but that there must always exist a drop when the pulp flows towards the roll, the pulp section in front of the roll must decrease more and more, and the pulp must flow faster and faster. It is obvious that the drop will be different when the density of the pulp is a different one, so that a beater which works excellently at a given density of the pulp entirely fails under otherwise equal conditions with a different pulp density. Experiments which went as far as a pulp density of 5 per cent showed that the factors mentioned have a numerical influence, and that it is possible to find by calculation the best suited shapes of the troughs, which have already been suggested by some beater manufacturers by instinct, so to speak.

In considering the roll, it must not be forgotten that it must deliver on the one side as much pulp as it takes up on the other, but that this quantity of pulp must again be exactly equal to that quantity which will flow within the time unit through any sectional area of the beater trough. There exists thus an inseparable relation between the circulation of the pulp in the trough and the feed of the pulp by the roll. It is obvious that the density of the pulp will, in this regard, be of the greatest importance, if, for instance, the pulp is assumed once very thin, and again very thick. In the latter instance the inertia of the pulp may be so great that far too little pulp enters into the cells of the roll for a noticeable circulation to be caused.

It is therefore possible to recognize, without the aid of mathematics, that there exists a given circumferential velocity of the roll for every beater and for every pulp density, at which velocity the best circulation of the pulp will be obtained. Also the shape of the backfall and its distance from the roll must depend on the density of the pulp, as on it again depends the quantity of pulp which is delivered by the roll. Is it thus not obvious that it is impossible to obtain a reliable calculation of the processes of motion in the beater without considering the density of the pulp?

Disintegration in the beater we may assume to be the result of a kind of friction between the roll and the bed-plate, and of the fibres being squeezed between the blades of the bed-plate and of the roll. Only the fibres which are seized between these two sets of blades are worked, squeezed, disintegrated. In this treatment only the specific pressure on the fibres themselves, not the specific pressure between the blades comes into question. With a thicker pulp, under otherwise equal conditions, more fibres will be simultaneously seized as with a thinner pulp, and thereby the degree of the treatment will be considerably influenced—in other words, the pressure between the thick roll and the bed-plate will, with a thicker pulp, be distributed to more, with a thinner pulp to fewer, fibres, and thereby the quality of the finished stuff is determined. We thus see that not only the circulation of the pulp, but also the disintegration greatly depends on the density of the pulp.

TARIFF CHANGES IN ROUMANIA.

The Government of Roumania has reduced the import duty on newsprint (rotary press paper) from 30 centimes to 5 centimes per 100 kilogrammes, as a result of negotiations entered into between paper manufacturers and the finance ministry in 1912.

THE DYESTUFFS SITUATION AND ITS LESSON

By DR. ARTHUR D. LITTLE.

Manufacturers of American flags are in no immediate danger of having to rely upon Cape Cod cranberries for their red, or California skies for their blues. Nor it is probable that our textile manufacturers generally will be forced to adopt the suggestion that we utilize our native rainbows to supply the tinctorial requirements of their industry. Six months ago the situation was different. You could have sold rainbows by the foot. The people generally, and even the consumers of dyestuffs, awoke at the first declaration of war to the long patent fact that the industries of these United States are dependent upon Germany for their supplies of coloring matters, synthetic drugs, and many other highly necessary products derived from coal tar. A situation which has been eminently satisfactory to consumers for many years suddenly appeared humiliating and intolerable when the embargo first threatened to cut off supplies. There were insistent demands for the immediate inauguration of an American coal-tar industry to relieve the situation and render impossible its recurrence. It was to be established by changing the tariff and the patent laws, and letting somebody else find the money. Government ownership of dyestuff plants was not considered seriously because there were no German plants interned.

With the lifting of the embargo and the resumption of shipments by way of Rotterdam most of the humiliation disappeared, while now there is even a growing disinclination upon the part of textile manufacturers to let the other fellow find the money—and make those essential changes in the tariff. The situation nevertheless remains one to cause concern and involves many factors which are worthy of your serious consideration.

All the world knows that during the last fifty years a sweeping revolution has been effected in the art of dyeing. The vegetable dyes, like logwood, fustic, sumac, madder, indigo, and many others, the few animal dyes like cochineal, and the relatively crude mineral pigments have all been displaced completely or in greater part by the products of synthetic chemistry after a record of tinctorial service extending back to the days of Genesis. The coal-tar color industry which began in 1856 with the discovery of mauve by an English boy of eighteen, known later as Sir William Henry Perkin, soon took root in Germany where it has attained its present great development and delicately adjusted organization mainly through the genius of a few and the plodding industry of many German chemists, the far-sighted courage of German financiers, and the technical and business sagacity of German managers. It is in a very real sense a created industry brought into being by the reaction of intellect upon the black chaos of coal tar. It is peculiarly a German industry, and its products for the most part may justly and proudly bear the legend "Made in Germany."

Contrary to popular belief, the products of this industry have displaced the old vegetable dyes because they are better, brighter, faster, easier of application, cheaper, and incomparably wider in color range.

With our textile and paper mills, paint and varnish manufacturers, makers of printing inks, and many minor industries thus definitely committed to the use of coal-tar dyes, it is not surprising that the student prospect of a dye-stuff famine should have occasioned grave concern. At the outbreak of the war the textile mills were generally credited with having not more than five months' supply on hand. The other industries concerned were probably less fortunate. For a time the German embargo on dye-stuffs prevented shipments, and stocks were rapidly depleted. Through the persistent, earnest and capable efforts of American representatives of the German manufacturers, shipments have been resumed under some restrictions but with reasonable regularity. The German plants are running at about 60 per cent capacity, and distribution of their product is regulated by the government through the Society of Dyestuff Manufacturers. The basis of allotment is said to be 75 per cent of the 1913 consumption distributed over monthly shipments, which must go forward in American boats. There is little doubt that to prevent reshipment to the Allies it is the German policy to keep our own mills in a chronic state of dyestuff hunger. As a result, many mills are now running from hand to mouth, others claim to be provided for three months, and a few for a somewhat longer period on certain lines of colors.

As a result of the close interdependence of the coal-tar dyes and coal-tar explosives industries, there has been a practically complete cessation of receipts of such dyes and developers as require for their manufacture nitric acid or raw materials derived from coal tar and available for the production of explosives—such materials, for example, as toluol and carbolic acid.

The acid blues and acid blacks largely used in dyeing woolens are already scarce, as are also most yellows and oranges and a wide variety of blues and greens. Paranitraniline, used in connection with pigment red in poster work, is practically out of the market, and it may be said that pigment workers generally find themselxes in an especially precarious condition as to dyes.

Nitro developers are cut off entirely, and beta-naphthol is obtainable only at prices which are almost prohibitive. Within a fortnight a large gingham mill has purchased 1,200 pounds, at $1.50 a pound, as against a normal price of nine to nine and a half cents.

In this connection it is only just to point out that the German manufacturers and the agents and importers here have handled the difficult and abnormal situation created by the war in a spirit of great fairness. They have prevented stocking up by greedy consumers, they have apportioned supplies impartially on the basis of past consumption, and they have shown remarkable restraint in the matter of prices. The present average advance on obtainable colors is about 25 per cent based on a 10 per cent increase in factory price and higher insurance and freights. In some cases the advance is 35 to 40 per cent. There is every prospect that with the diminution in the supply of raw materials prices will go much higher in the near future. There is a compensating, though somewhat remote, possibility that the manufacture of nitro dyes and develop-

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Address before the United States Chamber of Commerce, Washington.

ers may be resumed, as the German government has subsidized the construction of two large plants for the manufacture of nitric acid from the air, and these are expected to come into operation during the present month.

In the face of the present emergency, the textile mills are resorting wherever possible to the old vegetable dyes and are already making free use of logwood and fustic. As a result these woods and their extracts have experienced a marked advance, amounting, in case of fustic, to 100 per cent. Paper mills are endeavoring to confine their product to natural and white papers, or those which are tinted rather than deeply colored, and all consumers are husbanding their color resources with the utmost care and adopting makeshifts wherever possible. It is gratifying to note that in these efforts they have the cordial and effective co-operation of the laboratories and technical staffs of the great importing agents.

In 1913 the average dividend paid by German dyestuff factories was 21.74 per cent. The actual earnings were much greater and have sufficed in the past to provide sinking funds to cover the entire costs of development and plant. Few industries in the United States can make so good a showing. It seems reasonable, therefore, to inquire why we should endure indefinitely the present hardships, and why we should not have a coal-tar color industry of our own which should supply our wants without let or hindrance from Germany. There is but one answer to these questions, and but one consideration to restrain us. We can have such an industry whenever we are prepared to pay the price, but is it worth that price?

The coal-tar color and explosives industry as developed by Germany is probably the most highly organized of any industry in the world. Starting with less than a dozen crude raw materials, as benzol, toluol, anthracene, carbolic acid, etc., derived from coal tar, it builds up by complex chemical processes, which often involve elaborate and expensive plants and the most rigid scientific control of operating conditions, more than nine hundred separate ultimate products, and over three hundred intermediates so called, or over twelve hundred products in all, some of which cannot be turned out commercially in quantities much over a hundred pounds. The whole system of production depends for its commercial efficiency upon the close correlation and interdependence of these many products. The industry is self-contained. It makes its own crudes and converts its own wastes into raw materials for new processes to be applied to them by itself. The adjustment of the economic balance is so close that a slight change in the value of some one product may disarrange whole processes and affect disastrously many products. Obviously, therefore, at this stage of its development the industry must be considered as a whole if any effective competitive development in this country is to be attained. The situation is not unlike that now existing in our packing industry, where by rougher methods indeed but on a far greater scale, the entire raw material is utilized in a complex series of related products which are individually profitable only because of this relation to the others.

Twenty-two factories are involved in the German dyestuff industry, but by far the larger portion of the business is in the hands of four great companies. The industry as a whole is bound together by trade agreements and co-operative arrangements which add greatly to the efficiency of production.

A few figures regarding one of these companies are instructive. For transportation within the plant it utilizes forty-two miles of railroad. Its waterworks supply ten billion gallons yearly, and its ice factory twelve thousand tons of ice. It has four hundred steam engines, five hundred electric motors, nearly as many telephone stations, and twenty-five steam fire engines. It has a frontage on the Rhine of one and a half miles, and handles sulphuric acid in tank steamers. Seven years ago it employed two hundred and seventeen chemists, one hundred and forty-two civil engineers, eight thousand workmen, and a commercial staff of nine hundred and eighteen. Perhaps even more important from the present point of view of the American business man is this significant statement published by this company:

"On looking back upon the successes which the Badische Anilin und Soda Fabrik has achieved since its foundation, the management feels it to be its pleasant duty to remember gratefully the benevolent and appreciative support which its efforts have always met at the hands of the State authorities."

Within the last few weeks Dr. B. C. Hesse, of New York, who combines in a remarkable manner the functions of the chemist and statistician, has brought together many figures which bear upon our present problem and which give some indication of the price which we must pay for an American coal-tar color industry.

The world's production of all coal-tar dyes is substantially $100,000,000. The annual turn over of the German plants is about $80,000,000, and the plant value estimates not far from $400,000,000. It will be noted that the relation of plant investment to output is extremely high, being $5 to $1. The total export value of the German product was about $55,000,000, which was distributed among thirty-three countries. China takes four times as much German indigo as the United States consumes. The average wage in the industry was 4.80 marks, inclusive of boys, common labor, and skilled labor. The average men's wage was 5.85 marks, or $1.40, which is brought by bonuses and social service to the equivalent of $1.84. The gross average export value of the nine hundred and twelve dyes produced is $61,405 each, or, excepting a very few of the most important, the corresponding figure for the remaining nine hundred or more is $40,811. Dr. Hesse has characterized the German coal-tar color industry as "just about a one nation business," and on this showing I would ask you if Dr. Hesse is not right.

It is, nevertheless, an industry which has been replete with romance and with great achievement. The synthesis of alizarine, for example, gave a death blow to the cultivation of madder, of which forty-five years ago the annual production was about five hundred thousand tons. Synthetic indigo upset the social economy of whole regions in India, and made available for raising food great tracts of land before devoted to the cultivation of natural indigo. These triumphs of organic chemistry unquestionably reacted throughout the entire range of German industry, and did much to convert the nation to the cult of science, upon which its extraordinary efficiency in material affairs is based. These considerations, coupled with the industrial miracle of the genesis of the rainbow from so unpromising a material as coal tar, enables the coal-tar color industry to make a peculiarly powerful appeal to the imagination. We would be justly proud had we developed it ourselves.

We have in a sense had a coal-tar color industry in this country for thirty years, which has failed to take deep root or flourish even under the protection of a 30 per cent tariff, and during the very period when the German industry under the far greater stimulus of organized and persistent research achieved its greatest technical and commercial triumphs. There are today four plants in the country, and they make perhaps 15 per cent of the total American consumption, but confine themselves to less than one hundred products. They hold out no promise of extensive increase in production without government assistance to the extent of a 30 per cent ad valorem duty plus seven and one-half cents per pound specific and an effective anti-dumping clause. In this connection it might be pointed out that from 1880 to 1883 the ad valorem duty was 35 per cent with fifty cents specific. The present duty is 30 per cent on colors and 10 per cent on intermediates, with synthetic indigo and alizarine colors free. Under it probably not more than seventeen of the nine hundred and twelve German dyes are completely fabricated in this country; the remaining eighty-three of the one hundred types claimed as American products are merely developed or "assembled" here from intermediates obtained from Germany. Were our own manufacturers to secure the entire American business it would amount to only about $10,000,000 annually, a little more than the candy sold by the Woolworth stores.

Since the United States now produces 125,000,000 gallons of coal tar annually, it may here be pointed out that the country already possesses a coal-tar industry as distinguished from a coal-tar color and explosives industry, and that the coal-tar industry as such has been developed here to an extent unthought of in Germany. An average tar yields 70 per cent of pitch and only 6 per cent of materials useful to the color industry. In Europe the pitch is commonly used for fuel. In the United States, upon the other hand, over 90 per cent of the pitch is utilized in roofing, waterproofing and road making, while the creosote oil and naphthalene find other profitable and well-known applications.

The plain underlying reason why we have been unable during thirty years of tariff protection to develop in this country an independent and self-contained coal-tar color industry, while during the same period the Germans have magnificently succeeded, is to be found in the failure of our manufacturers and capitalists to realize the creative power and earning capacity of industrial research. This power and this capacity have been recognized by Germany, and on them as corner-stones her industries are based. As a result, the German color plants are now quite capable of meeting the demands of the whole world when peace is once restored. Why then should we duplicate them only to plunge into an industrial warfare against the most strongly fortified industrial position in the world? Let us rather console ourselves with a few reflections and then see how otherwise we might spend our money to our better advantage.

The gross business of the Woolworth five and ten cent stores in 1913 exceeded the entire export business of the whole German coal-tar color industry by $11,000,000. The sales of one mail-order house, Sears, Roebuck and Co., in the same year were far greater than the total output of all these German color plants, and its last special dividend at [illegible] twice the amount of their total dividend payment in 1913. The Eastman Kodak Company, with about twice the capital of the largest German color company, the Badische, and with a government suit on its hands, earned during 1913 net profits of over $14,000,000, or 230 per cent on its preferred stock and over 70 per cent on its common, while the Badische, with "the benevolent and appreciative support" of the German government, earned 45 per cent. In that year the entire German industry paid $11,000,000 in dividends. The Ford Motor Company, with one standardized product, does a greater annual business than all the German color plants with their twelve hundred products, and earns four times their combined dividend while paying three times their wages.

Now that our perspective is adjusted, let us consider for a moment some of the things which might be done with the vast expenditure of effort, money and research required to establish in this country this "one-nation" industry.

We should first of all review our own almost boundless natural resources, and especially should we consider our gigantic and shameful wastes. They offer opportunity for the ultimate development of a score of industries, each of a magnitude comparable to the color industry of Germany, and for the almost immediate upbuilding hundreds of smaller enterprises relatively no less profitable. We waste, for instance, one hundred and fifty million tons of wood a year, a billion feet of natural gas a day, millions of tons of flax straw at every harvest; untouched peat deposits fringe our entire Atlantic seaboard; beehive coke ovens flame for miles in Pennsylvania, wasting precious ammonia, and excite no comment, while the burning of a thousand-dollar house would draw a mob. The whole South is a reservoir of industrial wealth, untapped in any proper sense. We have heard these things so often that we can go to sleep while hearing them. We need to really sense them, to get before our consciousness a clear conception of what they actually mean in terms of wasted wealth and present opportunity. When we do this—and there is no better time than now—let us apply the lesson of the German coal-tar color industry to these far greater problems, and solve them by the compelling agency of sustained, intensive research.

To take one illustration only, the application to the lumber industry of the South of one-tenth the research energy and skill which were required to bring the coal-tar chemical industries to their present proud pre-eminence would unquestionably result in the creation of a whole series of great interlocking industries, each more profitable than that of lumbering. The South would be in a position to dominate the paper market of the world, it would transport denatured alcohol by pipe line and tank steamer, make thousands of tons of [illegible] cellulose-acetate film, turpentine, and develop along new lines and to far better purpose its languishing naval stores industry, and find new opportunity at every hand. To do these things in one industry, and many things as good in other industries, requires only a little faith, sustained, courageous effort, and the appreciation by American financiers of the earning power of research.

NO SWEDISH PAPER EXCHANGE.

The Swedish Paper Manufacturers' Association lately discussed the question of establishing an export exchange and sample exhibition at Stockholm. After fully considering the proposal it was decided not to give it effect.

With respect to the laboratory for chemicals and fibre products, for which a sum equalling $2,500 had been voted, a final decision was reserved.

WHO'S WHO IN THE CANADIAN PULP AND PAPER INDUSTRY

James Logie—"The Man Always on the Job."

"I heard that you wanted a boy, and perhaps you will give me a chance at the job," remarked a bright lad of twelve years, as he stepped into a stationer's store in Elgin, Scotland.

"Guess you would answer all right sonny," pleasantly rejoined the boss, "but I could not take you out of school without the consent of your father. You had better send him down and let me talk the matter over with him."

The latter interviewed the stationer early the next morning. The result was that the youthful applicant was indentured to serve an apprenticeship of five years, according to the system that prevails in Scotland between a master and an employee who wishes to learn any trade or calling.

Thus James Logie, of Toronto, "the man always on the job," who has just embarked in business on his own behalf, after many years service with large Scottish, English and Canadian paper firms, secured his first active connection with the trade.

His experience and insight have been thorough and varied. In that stationery and paper house in Elgin, under the terms of the indenture, he received three shillings per week for the first year, four for the second, five for the third, six for the fourth and ten shillings per week for the final year, or about two dollars and a half. What Canadian youth to-day would think of taking a situation which offered no greater inducements than this small sum and work from seven thirty o'clock in the morning until seven each evening. But young Logie was Scotch and possessed the determination and decision to master every detail of the trade, believing that a solid foundation was the best on which to erect a superstructure that would stand the test and strain of time, competition and expansion. He was first sent to the shipping room, learning how to handle and pack goods; then he was placed alternately behind the counter—often going out to deliver parcels and working at the books in the office.

The result was that at the termination of the contract, he was well qualified for promotion and, at seventeen years of age, secured a splendid position as manager of a large retail stationery house in Inverness, the capital of the Highlands, where book, writing, bond, and ledger papers, as well as many other kinds were handled and sold in considerable volume. After staying there a couple of years, he went down to the seaport city of Liverpool to further broaden his knowledge and grasp of affairs, and became identified with a flourishing mercantile printing concern, which dealt with many establishments. He was given charge of the stock room, all lines, both incoming and outgoing, having to pass through his hands, while he also had to assist in the buying. The second year he was appointed assistant manager, and did a good deal of the selling. Applying himself diligently and unremittingly to his duties, his health gave out at the end of five years, and he believed that a change would do him good.

For some time his eye had been cast in the direction of Canada, the land of opportunity, and in company with a friend, he started for Toronto, having in his pocket letters of introduction from several reputable paper houses in the Old Country, who knew the worth and character of his work. One of these letters was to John F. Ellis, of the Barber-Ellis Co., and on reaching the Queen City, the bearer and his bosom companion went straight to the warehouse of the latter concern. Mr. Ellis received them cordially and remarked: "Now I have a vacancy for one, but I cannot give both you chaps jobs. Drop in again to-morrow and I will see what I can do." Mr. Logie was taken on, and his friend obtained a place with another house. This was in 1889, and for three years Mr. Logie was with this firm, having charge of the stock and attending to the wants of customers, as well as doing some outside selling.

Going along King Street one day, he met T. A. Weldon, manager of the Toronto branch of the E. B. Eddy Co., who broached the subject of working for him, remarking that he thought he could use him to advantage. Mr. Logie did not give the matter much thought at the time, and Mr. Weldon passed, adding that he would see him later in regard to the proposition. Two days after, the latter gentleman again met him, and asked if he had a photograph of himself. "None, except one taken with my wife when we were married," replied Mr. Logie, wondering at the unusual nature of the question. "Well, get and post it to-night, sure, to Mr. Eddy, at Hull. Don't fail."

The picture was despatched, and the "Match King of Canada," as he was termed, was evidently favorably impressed. Thus the sender of the photograph became connected with the E. B. Eddy Co., with whom he remained for twenty-two years, seventeen as salesman under Mr. Weldon—until the latter in 1909 became one of the principal owners of the Montrose Paper Mills, at Thorold, after which Mr. Logie was appointed manager of the Toronto branch, resigning only a few weeks ago to enter business on his own behalf. The esteem in which the subject of this reference was held by the members of the staff, was attested on his retirement, when they presented him with a valuable gold watch, suitably engraved.

In his present quarters in the Foy Building, 32 Front Street West, Toronto, Mr. Logie has been appointed representative for several leading paper and woodenware firms and has made ample warehouse arrangements for storing stock. He carries in his new sphere of endeavor the best wishes of many friends. Speaking of him the other day, the manager of one of the largest paper houses in the province, remarked: "Yes! he is one of the fairest and squarest men in the trade, always on the job, and earning the respect and confidence not only of his customers but his competitors. His word, as good as his bond, and active in season and out, he rarely takes a holiday, and with him it is a case of business first, last and always. I know of no paper salesman who ranks higher in the general goodwill of the trade, upholding its best traditions and interests."

Six feet in stature, well built—of strong frame and quiet, gentlemanly disposition—with the capacity and love for work, abundant energy and cool judgment—Mr. Logie likes the game of selling. He possesses the faculty of retaining friendships and looking carefully after the welfare of customers. For nearly forty years he has made the marketing of paper, keeping stock and supplying patrons his life work, and therein lies the secret of his strong connection and intimate acquaintance with the business. A man of few hobbies, gardening and lawn bowling claim his leisure hours in "the good old summer time," and in the winter he is found at his own fireside, enjoying a quiet read and smoke, for although a member of several fraternal societies—Masonic, Maccabees and Workmen—he much prefers home associations.

GREAT NORTHERN PAPER COMPANY BUILD NEW DAM

(Written Specially for Pulp and Paper Magazine)

Millinocket, Me., March 22. — In the history of the development of the great pulp and paper industry of Maine a prominent part has been enacted by the Great Northern Paper Co., a group of capitalists which not many years ago came to Millinocket—then a part of the forest wilderness—and built a great paper mill. That mill was soon followed by another a short distance away and now the same large corporation which has already expended millions of dollars in Maine, is about to commence upon the erection of an immense concrete dam on the West Branch of the Penobscot river, above its mills, which will store billions of cubic feet of water for power purposes and will create a great lake, 20 or 25 miles in length, in the heart of the timber land district of Maine. Work will be commenced in the spring and will mark the beginning of one of the most important engineering feats ever accomplished in the state.

The dam is to be erected at the head of the famous Ripogenus gorge, one of the scenic attractions of the state, where for a distance of more than two miles the Penobscot river, narrowed to a raging torrent, rushes down through a narrow canyon whose precipitous sides tower from 50 to 100 feet from the surface of the water.

At the foot of Ripogenus lake, a small body of water about three miles in length, where the gorge begins, there is, between the two high walls of the natural defile, a perfect site for a dam, and here the mighty dam, nearly 50 feet high and several hundred feet long, will be erected.

This is nearly 40 miles from the nearest railroad in a section which, before the coming of the Great Northern Paper Co., was a wilderness traversed only by the rude "tote" roads of the lumber operations, but in order to facilitate the transportation of supplies and materials for the dam, a highway some 30 miles long from the shore of Moosehead lake to Ripogenus gorge has been built through the woods, and the thousands of tons of cement and other materials will be sent by rail to Moosehead lake, ferried across on huge scows to Lily Bay, the terminus of the road, and thence taken by automobiles to the site of the operation. The road, which is but one of an important system of woods highways built by the company, is a regular boulevard, coated with gravel and crushed rock, and built on scientific principles and over a carefully surveyed route, so that transportation may be done efficiently and quickly.

Six large motor trucks, which are being manufactured specially for the company by The White Company, have been contracted for and they will be used in handling all materials.

Two auto trucks, which have already been used by the company in handling supplies for their large operations north of Moosehead lake have demonstrated the value of the automobile in the lumber woods of Maine and led to the order for the six machines. Without them the proposition of handling the materials for the dam would be a costly one, and would make the erection of the dam almost prohibitive in price.

The chief engineer on this job will be Hardy S. Ferguson of New York City, who also maintains a Canadian office, and is one of the consulting engineers of the International St. John River Commission with S. J. Chapleau of the Department of Public Works of the Dominion of Canada. It was Mr. Ferguson who planned the development work already carried out in the storage of water on the Penobscot river, and designed the mills of the Great Northern Paper Company at Millinocket.

Last year a tract of land 11 acres in extent was cleared about the head of Ripogenus gorge, and the necessary sounding and borings made, so that all is in readiness for beginning the work just as soon as the pitch of water in the river will permit. On the cleared tract the preliminary work will consist of the erection of storehouses, blacksmith and machine shops, engineers' quarters, etc. Housing and feeding the small army of men to be employed in the construction of the dam will be no small task so far away from the base of supplies.

Plans have been laid for this great engineering work for several years past so nothing has been overlooked and when it is once finally commenced it is expected that it will be carried through to completion with hardly a hitch.

The possibility of power development is one that the engineers have taken into consideration in making the plans for the dam, and it is stated that a power plant will be installed and the power transmitted electrically to the company's plants down the river.

Government surveys made of the river stated that the gorge drops about 214 feet in a distance of two and a quarter miles, and that under a normal flow of water there is opportunity to develop 10,000 h.p. With the tremendous storage created by the dam the capacity of the development is increased to upwards of 40,000 h.p.

Not only is there a splendid site for power development at the head of the forge, but all the way down through the narrow walls of the fissure in the earth's surface present natural dam sites that would permit an aggregate development of a tremendous amount of power.

Ripogenus Gorge, at the head of which G. N. P. Co. is planning on erecting one of the largest dams in Maine during the coming year.

The dam will cause a back flowage, which will entirely flow out Ripogenus lake and will merge the waters of Ripogenus, Chesuncook and Caribou lakes, into one great body of water, nearly 25 miles in length. Chesuncook lake in itself is 18 miles long at the present time, and by means of a timber dam erected by the Great Northern Paper Co., holds a storage of about 16 billion cubic feet.

Engineers have estimated that to this amount the new dam will add from eight to ten billion cubic feet more, which with the already developed storage of the Twin lake system below of nearly 15 billion cubic feet will give the company a magnificent water storage, and insure a steady flow of water at all seasons of the year.

The chief damage to be done by flowing out this area will be to timberlands alone, and as the Great Northern owns these lands for the most part little difficulty will be encountered there. One or two sets of sporting camps will be many feet under water after the dam is built.

By means of the turnpiked highways in the woods and the automobile for transportation, both of which will figure largely in this new development, the Great Northern Paper Co., has done a great deal towards solving the high cost of transportation in connection with "toting" supplies to the lumber operations.

Several years ago the company established a depot farm about 13 miles north of Moosehead lake, and built a road to it that would do credit to many of the towns in the state. Before that road was done the supplies were carried over a wood's road of the typical kind that are seen in the forests and it was estimated that it cost the company somewhere near 75 cents per ton for transporting supplies. After the road was finished this cost was cut down to about 50 cents, the company still continuing to use horses. Last year two automobiles were put on and the result was amazing, the cost dropping to about 10 cents a ton mile.

The company has built an important system of roads which include the road from Moosehead lake to the site of the new dam, the Pittston farm road of 13 miles at the head of the lake, the 24 mile road from Rockwood, where the railroad comes to Moosehead, to the Pittston farm; and many miles of ordinary road which has not yet been turnpiked. A steel bridge, part of which was paid for by the company and part by the State, had to be erected on one of these roads.

The Great Northern has carried a march of progress right into the heart of the great wilderness of the Maine timberland section and the prsent work marks but one feature of the great development in the state in connection with the pulp and paper industry.

WATER STORAGE PLANS ADVANCED.

Col. Harry E. Talbott, former president of the Lake Superior Paper Company, of Sault Ste. Marie, Canada, and at present vice-president of the Mead Pulp and Paper Company, of Chillicothe, O., has just returned from Columbus, where, as the only member of the Dayton Flood Prevention Committee able to be present when the vote was taken, he stood guard for the interests of Dayton and the lower section of the Miami valley, while assault after assault was being made upon the Von der Heide law by a bitter and tenacious opponent. Colonel Talbott was beaming with smiles on his return home, declaring that in his opinion the fight is won and that the enemies of the conservancy movement will be unable to place any more serious obstacles in the way of the establishment of the reservoir system and the execution of plans looking to the protection of the lives and property in the Miami valley. "The friends of the measure must now engage in a campaign of education," said Colonel Talbott. "Three-fourths of the people in the upper portions of the Miami valley have been misled through the art of dissembling and as soon as the truth is known the whole valley will ring in its approval of the measure. There may yet be some stray skirmishes," he continued, "but the main fight is won and the conservancy movement is safely launched. Within due time we will have our valley properly and effectively protected against future devastation such as wept it two years ago."—"Paper."

William Hague Evans, who for over thirty years was in the paper, book and stationery business in Toronto, passed away a few days ago, aged seventy-two years.

Hemlock as a Pulpwood

Increasing Use of the Wood as a Source of Mechanical and Sulphite Pulps.

Hemlock, which supplies more raw material for paper pulp than any other tree in the United States except spruce, is the subject of study from a forestry standpoint in a bulletin issued February 3, 1915, by the United States Department of Agriculture, the author being E. H. Frothingham, of the Forest Service. Referring specifically to the use of hemlock in pulp manufacture, the bulletin says that in 1905 hemlock formed 11.8 per cent of all the wood used for pulp. In 1906 and 1907 it supplied 14 per cent of the total amount; in 1908, 17 per cent; in 1909, 14 per cent; and in 1910, 15 per cent. During the latter year its consumption was 50 per cent greater than in 1905.

Hemlock pulp is used for news, wrapping, and other cheap grades of paper, and is manufactured chiefly by the sulphite process. In this process the wood is first chipped and then cooked in a solution of calcium sulphite, which frees the fibres by dissolving the substances that unite them. The dissolved substances comprise about half the original weight of the dry wood, without bark. Hemlock also furnishes a small amount of groundwood pulp, but the great bulk of this is spruce. Groundwood is inferior to chemical pulp, since the fibres become broken in grinding, while the pulp contains the useless constituents which are dissolved out in the chemical process. As a result it is mealy and less interlaceable, especially in the case of hemlock, the fibres of which are shorter than those of spruce. In spite of this, a very serviceable grade of newsprint paper can be made from hemlock pulp, 75 per cent ground and 25 per cent sulphite, with almost the strength, finish, and appearance of that made chiefly of spruce.

Since the value per ton of groundwood is only about $15, as compared with $47 for sulphite pulp, the former is used as the basis for news and other cheap grades of paper, to which a small amount of sulphite pulp is added for strength. Spruce once furnished practically all of both kinds of pulp, and still supplies 90 per cent of the mechanical pulp. Its increasing cost has brought about the use of cheaper woods in the sulphite process, during which a large amount of the wood is lost. Spruce now supplies less than 60 per cent of the sulphite pulp, while hemlock supplies about 25 per cent. The quantities of hemlock manufactured by the various processes for the six years from 1905 to 1910, inclusive were:—

	Per Cent.
Sulphite process	94.75
Mechanical process	4.5
Soda process	.7
Sulphate process	.05
	100.00

Hemlock pulpwood is marketed both as cordwood and in the log. In Wisconsin pieces eight inches and upward at the small end are ordinarily cut in log lengths and sold by the thousand board feet (1,000 board feet usually being considered equivalent to two cords). Pieces less than eight inches at the small end are sold by the "pulp cord," a stack containing 128 cubic feet of stacked (not solid) wood, with the bark on. Unlike most cordwood, however, the pieces are not cut in four-foot lengths, but usually in lengths of eight feet, twelve feet, etc., according to the demands of the mill to which they are sold. Pieces less than four inches at the small end are rarely accepted. About 65 per cent of the wood is sold with the bark on, 33 per cent peeled, and about 2 per cent rossed.

The use for pulp of waste material left after lumbering has recently been introduced in parts of Pennsylvania. Hemlock tops and broken and defective logs are peeled, cut into five-foot lengths, piled in the woods, and sold by the cord. The success of this practice disposes of the contention that the knots in hemlock tops make their use for pulp impracticable. From 250,000 to 260,000 cords of slab wood and other sawmill waste are now consumed every year for pulp. About 85 per cent of this is manufactured as sulphite pulp, and practically all the rest as groundwood. In 1908 hemlock formed 41 per cent of the sawmill waste used, and its average value was $4.07 per cord—about two-thirds that of hemlock cordwood in the round. In Wisconsin, sawmills often sell their hemlock slabs to the paper mills for $3 per cord, dry, or $2 green.

The cost and value per cord and per thousand b.m. feet of pulpwood vary somewhat in different regions, and there are constant fluctuations due to changing business conditions. The price also depends upon whether the wood is sold peeled, rossed, or with the bark on. In 1909, according to census reports, wood with the bark on sold for $5.98 a cord, while peeled wood brought $6.58, and the small amount of rossed wood $12.31 a cord.

The average f.o.b. value per cord of hemlock in different regions in comparison with other pulpwoods is shown in the accompanying table.

Average f.o.b. Value Per Cord of Hemlock Pulpwood Compared With Other Species.

Compiled from census reports for 1907, 1908, and 1909.

Region.	Year.	Hemlock.	Spruce (domestic).	Balsam.	Poplar (domestic).
Total	1907	$5.68	$8.55	$7.59	$7.85
	1908	6.02	8.76	7.23	8.01
	1909	6.30	9.32	8.28	7.96
New England	1907	7.10	8.48	8.30	7.51
	1908	7.18	8.51	7.58	7.54
New York	1907	6.79	8.13	9.17	8.25
	1908	7.47	8.58	8.22	8.49
Pennsylvania	1907	5.13	9.26	....	8.62
	1908	5.05	10.94	9.53	9.16
Lake States	1907	5.83	9.88	5.84	4.45
	1908	[1] 6.36	10.05	6.39	4.93

Pulp mills may pay as high as $12 per thousand board feet, in the log, and accept crooked logs. This fact is important in view of the low "mill run" value of hemlock lumber, which is rarely much over $15 per thousand board feet at the mill, and for which crookedness is a more or less serious defect. The pulp mills also prefer to receive their wood peeled, and will often pay $1 more per thousand board feet for peeled than for unpeeled logs. Peeled logs are cheaper to transport and more durable than unpeeled ones, and there is no expense for peeling.—"Paper."

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[1] During the financial depression of 1908 the market value of hemlock logs in northern Wisconsin dropped in some cases to $7 per thousand board feet, equivalent to $3.50 per cord) f.o.b. cars. No logger would deliver hemlock pulpwood for less, and of this amount, $2.50 would probably go to the jobber to whom the work was let out.

UNITED STATES NOTES

(Special to Pulp and Paper Magazine.)

The six directors of the Cliff Paper Company, whose term had expired, were reelected at the annual meeting several weeks ago of the stockholders of that company at Niagara Falls, N.Y. These directors subsequently convened and reelected the following officers: J. F. Schoelkopf, president; E. W. Grigg, vice-president; Paul E. Schoelkopf, secretary-treasurer; and M. J. Argy, superintendent.

* * *

During the last weeks of its session, Congress refused to grant the $5,000 appropriation asked for by the Paper Laboratory of the Bureau of Standards to carry on special work.

* * *

The Sefton Manufacturing Company, of Anderson, Ind., reports that all employees are now working on full time. For some time past the factory has been operating on part time, but increased orders for paper boxes and corrugated specialties has necessitated placing all of the 350 hands on a full fifty-four hour week basis.

* * *

The paper mill supply business conducted for many years by the late Adolph Salomon at 140 Nassau Street, New York City, has just been incorporated under the corporated name of A. Salomon, Inc. E. Salomon, son of the founder of the business is president of the new corporation. He has been for some time past connected with Felix Salomon & Co., but has resigned his position with that house to assume his new duties.

* * *

The Outlook Envelope Company, Worcester, Mass., the originators of the United States Envelope Company manufacturers of window envelopes, announce that they have been successful in their suit against the Samuel Cupples Envelope Company, St. Louis, Mo. and New York City, for infringement of their patents in window envelope machinery, which suit has been in litigation for about five years.

* * *

Though business generally during the past year is conceded to have been bad, paper manufacturers have not let the grass grow under their feet in the matter of preparing for the future. This was emphasized at the annual meeting of the stockholders of the Black Clawson Co., paper machine mfrs., held several weeks ago at Hamilton, Ohio. According to the company's books, a fairly prosperous year was enjoyed, with bright prospects ahead. This indicates that paper manufacturers have not been adverse to purchasing new machinery and equipment. It was stated at this meeting that while certain periods of the year showed depression, there were other times when substantial orders were received. The machinery concerns are a good barometer of the paper industry, and the report of this company reflects the general situation in the industry.

* * *

The pulpwood business established several years ago at Watertown N. Y. by Frank A. Sommerville, has been incorporated under the corporate name of the Summerville Pulpwood Company. The present offices of the company are located in the Smith Building. Mr. Summerville will continue to be indentified with the company, though it is understood that Edward W. Elsworth is at the head of the corporation. In addition to pulpwood now handled the concern will broaden its scope to cover the sale of Canadian ground wood and Norwegian sulphite. The greater part of the pulp wood will be produced from the Canadian markets at Quebec.

* * *

Sailing from Fowey, England, on February 24, the steamer Brantford arrived at Portland, Me. last week with a cargo of 1,741 tons of China Clay, consigned to the Chase-Leavit Company, of that place.

* * *

The paper manufacturing plant of Case Brothers, at Highland Park, near Manchester, Conn., suffered a fire loss on Saturday night of last week, which is estimated at about $125,000. The fire is believed to have started in some paper shavings in the finishing room, but the exact cause has not yet been determined. It was only a week previous that the mill had resumed its full operations. As soon as insurance adjustments are made, it is understood that work will be started in rebuilding the burned parts.

* * *

The National Association of Waste Material Dealers held its second annual meeting at the Hotel Astor, New York City, on Tuesday, March 16. Although only two years old, the association now has 101 members. The meeting of the paper stock division was well attended, and many matters of importance were discussed, among them being the necessity of cooperation with the felt makers for betterment of general conditions. A committee was appointed to negotiate with that association, and was empowered to act in any way it saw fit.

* * *

The meeting of paper jobbers and manufacturers which was scheduled to take place at the Bureau of Standards at Washington this winter, has been postponed to a date not yet set. Mr. Clark of the paper laboratory says that the meeting was postponed on account of the laboratory being upset for sometime past. He is enlarging his paper machine and the work has been slow on account of the amount of testing work that has been sent in lately. The purpose of the meeting is to allow the paper men and the government officials to get together and discuss the government paper specifications.

* * *

Reports from the John Brook Valley state that four thousands cords of spruce pulp wood have been cut by Beede Brothers and are awaiting the opening of the Ausable River to be floated down to Ausable Forks, N. Y.

* * *

Joseph Pauche, the papermaker who was caught in the rolls of No. 4 machine at the Oxford Paper mill at Rumford, Me. Saturday evening, died Monday evening at the McCarthy hospital as a result of the shock and the effects of the accident.

The Green Bay Foundry and Machine Works, Green Bay, Wis., is at present manufacturing a new "safety first" device for the protection of workingmen's hands and arms while they are working near the large rolls in paper mills. It is stated that the company has a large call for this device and many of them are being installed in the surrounding mills.

* * *

The Paper Makers' union had another in its series of open meetings Sunday afternoon of last week in Unity Hall, West Fitchburg, Mass. It was followed by the regular business meeting of the organization, at which time a large number of applicants were admitted to membership and it was voted that permanent headquarters be established. A committee was appointed to secure quarters for the secretary and also social rooms in the West End.

* * *

A persistent rumor to the effect that a portion of the big plant of S. D. Warren & Co. of Westbrook is about to be closed in order to curtail the output of paper and dispose of the large stock stored in the warehouses is absolutely denied by General Manager Nelson R. Davis. He states that of the twelve paper machines in the mill nine are in full operation, two are stopped for the purpose of repairs and alterations and one is being replaced by a large machine of a new type.

* * *

In reviewing the Paper market in Maine, the Lewiston Journal says: "American paper mills fear shortage of wood pulp supplies. Pulp wood imports from Russia have been stopped by Germans. There is a considerable stock on hand but unless conditions in the Baltic undergo a complete change, enabling the free movement of pulp wood from Russia to the pulp mills of Norway, Sweden and Denmark, there will be a acute shortage of American paper mills consuming chemical wood pulp depend on foreign pulp. Maine paper mills are lucky—they have their own forests or easy access to Canadian forests."

Larger International Paper Company Dividend

(Special to Pulp and Paper Magazine.)

New York, N.Y., March 25, 1915.

The financial statement of the International Paper Company, showing net earnings available for dividends of $1,147,709.38 issued about a month ago, has caused some comment on the part of the preferred stockholders who are now beginning to wonder whether or not they are going to get increased dividends. Of the net earnings only $448,134 is set aside for dividends, the balance being thrown into surplus. Many of the stockholders claim that the earnings of the company during 1914 warranted their expectations of an increased dividend. If the earnings continue to increase in the future, as they have in the past, it is pointed out, the company in another year or two ought to be able to increase its present two per cent rate to three per cent, or possibly better.

During the past four years the International Paper Company has had money to turn back into plant account. Much more than mere ordinary maintenance has been attended to. Not far from $4,000,000 of surplus earnings has been used in bringing plants up to a higher state of efficiency, and this money has come out of earnings and has not been capitalized as in the old days. The result has been a lowered cost of production which is very well reflected in the satisfactory results of the twelve months ended December 31, 1914.

A lessened demand for newsprint on the part of the press resulted from business depression. Added to this was a sudden influx of large quantities of Canadian paper, coming in duty free under the provisions of the present tariff, which bears severely upon makers of newsprint as a class. The result was that demand and supply got out of plumb in 1914 and this lack of balance still exists. It is reliably estimated that Canada is to-day shipping 1,000 to 1,100 tons of newsprint daily into American markets. Three years ago the entire newsprint production of Canada was only 450 tons per day—but, to-day it is estimated at 1,500 tons, two-thirds of which comes to the United States.

"Our company was able to maintain last year the same high standard of depreciation that has held under the present management," said an official of the International Paper Company this week. "About $1,083,538 was charged for depreciation before any dividend balance was struck and, in fact, before allowing for interest obligations. Back in 1911 the allowance for depreciation was but $484,760. In the case of our company this depreciation allowance is very vital. The property has never had an adequate depreciation allowance except under the present management, and the change for the better in this respect is the explanation of continued strong earnings in the face of adverse business conditions."

INTERNATIONAL RENEWING CONTRACTS ON 1914 BASIS.

(Special to Pulp and Paper Magazine.)

New York, N.Y., March 25, 1915.

The International Paper Company has been renewing all of its expiring contracts on the basis of the same terms as in 1914. For the greater part of its tonnage the company has been asking and receiving 2.15 cents per pound. This is not the advance that seemed possible when the war first broke out and the demand for newsprint jumped by leaps and bounds, but it is a maintenance of existing prices. For such sulphite as the company makes in excess of its requirements and sells in the open market, it is receiving a substantial advance in price, which is of course a material aid towards net profits. The company has adapted a strict policy of selling only at a price showing a fair margin of profit. It has declined to shade quotations to get business, and has naturally been obliged to pass by certain orders that it otherwise could have booked. The company is at present outputting about 90 per cent of its capacity and is earning at the rate of between $4 and $4.50 per share on its $22,406,700 preferred stock.

A charter has been granted to the Universal Wall Paper Co., of Toronto, with a capital stock of $100,000. The company, under its letters of incorporation, has very wide powers and among them is to manufacture and deal in all kinds of wares, goods and merchandise.

PULP AND PAPER NEWS

S. F. Duncan, secretary-treasurer of the Provincial Paper Mills Co., Toronto, who has been spending several weeks with his wife and family at Daytona Beach, Florida, has returned home.

* * *

The Thorold Pulp Co., whose plant was destroyed by fire some weeks ago at Thorold, Ont., have razed the old building, and are making preparations for the erection of their new mill, work on which will be rushed.

* * *

Robson Black, of Toronto, a well-known newspaper man and writer for magazines, has been appointed secretary of the Canadian Forestry Association, and will enter upon his new duties in Ottawa on May 1. He takes the place of James Lawler, who resigned some time ago in order to assume a position in the forestry branch as editor of the literature sent out by that department.

* * *

The householders of Toronto are comparatively happy as they can now dispose of old papers, magazines and mixed rags of all kinds to good advantage. Heretofore, it has been impossible for the thrifty house wife to get rid of loose newspapers and magazines at any price as the dealers confined their purchases to the stores, factories and the business centre of the city. The Western Rag and Metal Co., Limited, 442 King Street, East, Toronto, have announced that they want one thousand tons of paper and rags, and will gladly call in response to a telephone message. Some of the prices announced are: White cotton and woolen rags per pound, one cent; mixed rags of all kinds per pound three quarters of a cent; tailor clips, three to five cents per pound; bundled newspapers and magazines, per hundred pounds, twenty-five cents; loose newspapers per hundred pounds, twenty cents.

* * *

A charter has been granted to Preston and Sons, Limited, of Brantford, with a capital stock of one hundred thousand dollars, to engage in the printing and publishing business and to acquire the business and assets of T. H. Preston, including the Brantford Exposition newspaper.

* * *

The annual meeting of the F. N. Burt Co., Toronto, will be held on March 31. The company has just declared a dividend of one and three-quarter per cent on the preferred stock and one per cent on the common stock for the past quarter. The net profits for the past year were $212,392 or within $5,000 of reaching the profits of 1913. The total surplus is $152,263 compared with $145,635 in 1913. This showing was made possible by the reduction of the common dividend from six to four per cent, which economy in disbursement permitted a larger amount to be carried forward to the current year. The total assets of the company are $3,303,148. The Pacific-Burt Co. has just declared a dividend of one and three-quarters per cent on the preferred stock.

The fire ranging force of Ontario will be reduced by about one hundred and seventy-five men, because of an arrangement with the Dominion Railway Board, by which the latter undertakes to patrol five hundred miles of the Canadian Northern Railway line between Sudbury and Port Arthur. Men, who live in the north country, and have had bush experience, are to be given the preference.

* * *

An important change has taken place on the Toronto News, C. Lesslie Wilson, of the Wilson Publishing Co., acquiring the stock of T. C. Pearce, and succeeding him as General Manager of the Company. Mr. Wilson has entered upon his new duties. He has been for several years business manager of the Wilson Publishing Co., which supplies about two hundred weekly papers in Ontario with ready print "insides."

* * *

The Workmen's Compensation Act, which went into effect at the beginning of the year, appears to be working out satisfactorily, and in the neighborhood of a million dollars has been collected by the Board. It is said that, in a normal year, the amount from total annual assessments would reach nearly as much again. Over two-thirds of the employers of Ontario have paid the full year's assessment into the Board. Since the Act came into force three months ago about two thousand notices of accidents have been sent to the Board, but nearly half of these did not mean loss of work for over seven days, so no claim can be made. Thirty-five fatal accidents have occurred since January 1, which come under the Act. It is expected that, when the tabulation of employers is complete, there will be a substantial reduction in nearly all the groups so far as the assessment is concerned. Pulp and paper manufacturers come under class two. The rate on pulp and paper manufacturers is 1.40, and on paper mills not manufacturing wood pulp, 1.20 on the total on the pay roll.

* * *

The many friends in the trade of Fred. W. Halls, of the Fred. W. Halls Paper Co., Toronto, will sympathise with him in the loss of his father, William Halls, a leading contractor, who passed away a few days ago.

* * *

The Lumbermen's Safety Association, has been granted a charter with headquarters in Toronto, without share capital, to promote and carry on the work of prevention of accidents in the lumbering industry and in any other industries which may for the time being and from time to time be assessable by the Workmen's Compensation Board in the same insurance group as lumbering and generally to represent employers engaged in such industries in connection with the administration of the Compensation Act. The incorporators are John R. Booth, Sir H. K. Egan and Hon. George Gordon of Ottawa, D. McLachlin of Arnprior, and William E. Bigwood, of Toronto.

NEW PATENTS

Edward M. Hall, Deferiet, N. Y., assignor to the Hall Process Corporation, U. S. Patent No. 1,132,258.

The inventor says: The object I have in view, is to produce wood pulp, the fibres of which shall be longer, stronger and more uniform than those secured by any of the mechanical processes now in use. The most widely used mechanical process consists in subjecting logs of wood to the abrasive action of the surface of a revolving circular stone. In this process the fibres separated from the wood are lodged on the surface of the stone, and are subjected to a rolling and grinding action, as the stone passes under the surface of the logs, thereby weakening the fibres and breaking them into short lengths.

My invention relates to a method and means for preventing this grinding of the separated fibres, and I accomplish this by depositing the fibres in suitable depressions located in the periphery of the stone, whereby they are protected from the grinding action as the surface of the stone passes under the various logs to be ground.

Fig. 1 is a vertical section of a well known form of pulp machine in which the stone is prepared in accordance with my invention. Fig. 2 is an end view and Fig. 3 a front view of a portion of the stone showing one method of practising my invention, and Figs. 4, 5, 6, 7 and 8 are front views, respectively, of a portion of the stone showing other methods of practising my invention.

The circular stone 1, employed for reducing the wood to fibre, is mounted in a vertical position on a shaft 2, turning in suitable bearings. The upper half of the stone is covered with a hood 3, containing one or more pockets or magazines for the reception of the wood to be reduced to pulp. In Fig. 1 I have shown a machine having three magazines 4, 5 and 6, which is the usual number in machines most generally in use.

In the operation of this device the stone is caused to revolve in the direction of the arrow, and the logs 7 having been first barked and otherwise prepared, are placed into the magazines so that they lie on the surface, and with their sides parallel to the axis of the stone. Pressure is applied to the followers 8, and the logs are forced against, and subjected to the abrasive action of the surface of the revolving stone.

At a point below its axis a spray of water 9 is directed onto the surface of the stone. A sufficient amount of the moisture is carried around on the surface of the stone to moisten the surface of the logs and convert the fibres into a soft mass, which is washed off the surface of the stone and falls into the vat below.

For some years prior to my invention it has been the practice to roughen the surface of the stone used in these pulp machines and one customary plan for sharpening the stone is illustrated in Figs. 2 and 3 wherein the surface d, between the grooves c, is shown as being scored, with shallow depressions a extending across the surface of the stone at an angle to its axis, between which are the slightly raised portions b. The stone 1 is caused to revolve in the direction of the arrow at a high rate of speed, varying from 150 to 250 revolutions per minute, depending on the size of the stone. Points on the slightly raised diagonal ridges b, pass over the surface of the logs in lines substantially perpendicular to the length of the fibres, which are torn out and separated from the mass which makes up the log. These fibres which are torn out of the

Fig 1

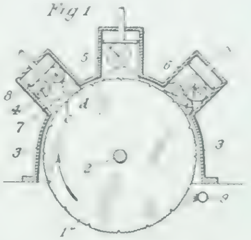


Fig 2

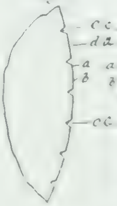


Fig. 3

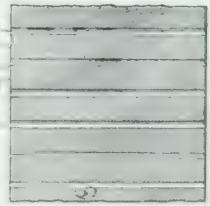


Fig 4

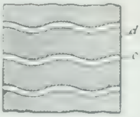


Fig 5.

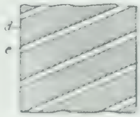


Fig 6

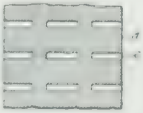


Fig 7

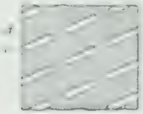
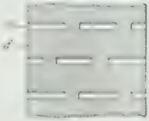


Fig 8



left hand portion of the log in magazine 4 are caught on the surface of the stone and as it moves forward the fibres are subjected to a rolling or grinding action between the surface of the stone and the under surface of the logs in the same magazine, and as the stone moves forward all of the fibres separated at the first magazine are subjected to further grinding action in magazines 5 and 6. The fibres are, therefore, not only ground in the same magazine in which they are separated, but are subjected to additional grinding in other magazines, and this results in bruising the fibres and breaking them up into short lengths. This process, practised for many years without substantial change, results in the production of pulp, the fibres of which are so short and so weak that it is impracticable to attempt the commercial production of print paper solely from such pulp. Hence it is the usual practice to mix the pulp produced by the mechanical process I have described with chemically prepared pulp, the fibres of which are longer and stronger, in the proportion of 75 to 80 per cent mechanically prepared pulp to 25 to 20 per cent chemically prepared pulp.

I have discovered an important, and, I believe, a radically new, improvement, in the above described mechanical process of reducing wood to pulp.

My invention consists in subjecting the wood to be reduced to pulp to the abrasive action of a rapidly moving roughened surface, and then withdrawing the separated fibres and depositing them in depressions in the abrasive surface so as to protect the fibres from being subjected to an appreciable and objectionable grinding action between the abrasive surface and the under surface of the logs.

One plan for utilizing my invention, in connection with the pulp machines I have described above, is shown in Figs. 2 and 3, wherein a series of grooves c are indicated extending across and located in the surface of the stone. The surface of the stone between the grooves is roughened in the usual manner. As an abrasive surface d comes under the left hand under surface of the log 7 in magazine 4, the fibres which are torn out, instead of remaining on the surfce of the stone, are pushed down into the next, or one of the succeeding grooves c, and are thus removed from the abrasive surface of the stone and protected from the grinding action to which they would otherwise be subjected in the same and succeeding magazines. This is the action which takes place as each abrasive surface passes under the logs in the various magazines, and thus the fibres, or the greater portion of them, are collected in the grooves c, and protected from the objectionable grinding action as they pass under the logs in the various magazines, until they pass under the spray 9, which washes them out of the grooves into the tank below. I have shown the grooves c of triangular shape and disposed in a straight line across the surface of the stone, and parallel with its axis, I prefer to make the grooves one-eighth of an inch deep and one-eighth of an inch wide at their mouths, and to dispose them around the surface of the stone about three-quarters of an inch apart, measuring from centre to centre of the grooves.

It has been my experience that grooves of the shape and general direction of location shown in Figs. 2 and 3, and separated from each other about three-quarters of an inch, are most readily produced in the surface of the stone, and that they are well adapted to collect the fibres, from which they are easily discharged by the action of the spray, assisted by the centrifugal force of the revolving stone. But without departing from my invention, the shape and dimensions of the grooves, the distance between them and the direction in which they extend across the stone may, of course, be varied. The grooves may extend across the face of the stone in a wavy line or in a straight line, but at an angle to the axis of the stone, as is shown in Figs. 4 and 5 respectively.

Instead of grooves extending entirely across the surface of the stone, I may use cells distributed over the surface of the stone, and located in lines either parallel or at an angle to the axis of the stone, and the cells of one line may be staggered with reference to those of another line, as are shown in Figs. 6, 7 and 8 respectively. It is also to be understood that I am not confined in the practice of my invention to the use of a circular stone, but the abrasive implement may be of any suitable form and its surface may be made of any suitable material.

By the use of my process I secure an increased output and a superior quality of pulp for the amount of power consumed. The fibres of the pulp produced by my process are long and strong enough to permit of the manufacture of paper, wholly from this pulp without the addition of any chemically prepared pulp. This results in a very considerable saving in the cost of manufacture of paper, and the elimination of several troublesome features experienced in the production of paper from mixed pulp.

The fibres of chemically prepared pulp shrink more readily than the fibres of mechanically prepared pulp when subjected to the heat necessary to evaporate the water in the process of manufacture of the paper, resulting in the drawing of the web to such an extent that the paper sometimes "curls" on the rolls. Also, the chemically prepared pulp is frequently "gummy," which tends to cause the paper to stick to the rolls as it passes through the presses. These objectionable features, present in the manufacture of paper from mixed pulp, are entirely eliminated when paper is made wholly from pulp produced by my process, in which the fibres are clean and uniform in strength and quality.

MEASURING THE DENSITY OF WHOLESTUFF.

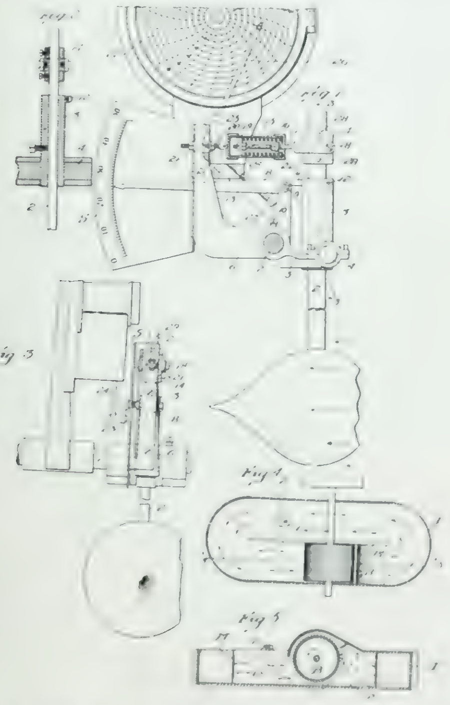
An Apparatus for Measuring or Determining the Viscosity of Wholestuff in the Beater.—Arthur B. Green, of Portland, Me., Inventor, assignor to S. D. Warren & Co., Boston, Mass.

U.S. Patent No. 1,125,017, January 12, 1915.

The patentee says of his invention:—The invention relates to apparatus for measuring, indicating, and making a record of the variations in the physical properties of the paper "stuff" during the beating operation by which the surface friction against solid bodies and internal friction, or viscosity, may be definitely determined in relation to a given standard. By measuring and indicating the variations in these physical properties during the process of beating, the extent of treatment the stuff has undergone may be very accurately judged, and by so blending the various ingredients of the paper stuff as to bring these physical properties to definite values at the beginning of the operation of each run, the density of the stuff (that is, the required proportion of solid matter to water) may be regulated according to a predetermined standard.

The improved apparatus employed for this purpose comprises an object of desired form, preferably a prolate spheroid with projecting polar spurs, or it may be more familiarly termed approximately lemon-shaped, submerged in the stuff having a normally unobstructed flow in the tub, which is open to atmospheric pressure, and this object or drag being held against lateral displacement but adapted to be moved longitudinally of the tub through the friction of the stuff as it continuously flows past under the influence of a constant propelling mechanism operating at constant speed.

The resistance of this object, or drag, to the passage of the stuff depends upon the two physical factors named—that is, surface and internal friction of the stuff—and the total resistance is measured by a suitable system of lever connections between the drag supporting rod and an indicator on a scale, and the variations in such resistance, which correspond with the variations in the density and fluidity of the stuff, are recorded by means of connection between said lever system and an automatically operated recording device. By varying the shape of the submerged drag, either of the elements of resistance may be accentuated above the other, and thus it may be made to measure to the greater degree whichever of the elements varies the most under given conditions.



It is found that the lemon-shaped drag tends to emphasize the viscosity as the chief factor in the force exerted by the stuff upon the drag.

In the drawings, Figure 1 is a front elevation of the measuring and recording apparatus, the rod to which the drag is attached being shown broken; Fig. 2 is a sectional view of the supporting sleeve, secured to the drag rod, on line 3—3, Fig. 1; Fig. 3 is an elevation of the apparatus shown in Fig. 1, viewed from the right of that figure; Fig. 4 is a plan of the beater tub showing the position of the drag and of the shaft which supports the measuring and recording apparatus in relation to the tub; and Fig. 5 is a vertical section of the tub on line 5—5, Fig. 4.

Referring to the drawings by indicating characters, 1 is a lemon-shaped bulb or drag submerged in the stuff tub T of the beater. 2 is the supporting rod for the drag which passes up through a sleeve 3 vertically adjustable thereon, and supported in journals 4 carried by arm 5 of the supporting frame 6. This frame and the whole apparatus is supported upon a shaft 7 which has bearings upon one side of the tub T and upon a central vertical partition, or mid-feather, M, in the tub, as indicated in dotted lines, Fig. 4; the frame 6 being keyed to the shaft 7.

The sleeve 3 and rod 2 with other parts attached thereto may be tilted upon the journal 4 in a plane parallel with the length of the tub. An indicating finger 8 is pivoted at 9 upon an arm 10 projecting upward from the frame 6, and a link 11 is pivoted at one end to the indicating finger 8 above its pivotal point 9, and at its other end the link is pivoted at 12 to the sleeve 3, so that as the rod 2 and sleeve 3 are tilted upon the journal 4, the indicating finger 8 will be caused to swing up and down upon its pivot 9, the point of the finger swinging over the scale S, graduated in suitable units. 13 is an upwardly projecting arm of the supporting frame, and between its upper end and a holding sleeve 14, which is secured to the rod 2, is a cylindrical casing 15, containing a coiled spring 16.

A piston rod 17 within the cylinder 15 extends outward and is pivoted at 18 to the sleeve 14. To the inner end of the piston rod 17 a piston 19 is attached, and the corresponding end of the cylinder 15 is pivotally connected by a screw-threaded rod 20 to the upper end of the arm 13, and may be adjusted longitudinally by means of nuts 21 upon either side of the arm 13, and vertically in a slot 29 in the upper end of that arm, Fig. 4.

Sleeve 14 is also adjustable vertically on rod 2 to correspond with this vertical adjustment in slot 29. The object of these two adjustments, affecting the elevation of the casing 15 with its spring 16 above the journal 4, is to compensate for errors in the stiffness of the spring 16, so as to obtain comparable results from different instruments. A stiff spring should be placed below the normal elevation; a weak spring, above the normal elevation.

The piston 19 is adjustable on the rod 17, and on this rod near the opposite end of the cylinder 15 is an adjusting, or stop-nut 22, by which the compression of the spring 16 is limited, as also the movement of the rod 17 out of the cylinder, thus determining the upward movement of the indicating finger 8 caused by its connection through the link 11 with the upper end of the sleeve 3 when that end swings to the right Fig 1.

By the adjustment of the nut 22 on the rod 17, and the nuts 21 on the rod 20, the several parts can be regulated so that the finger 8 will stop at the extreme limits of the scale S, which indicates the maximum movement of the drag 1 caused by the friction of the paper stuff as it flows past the drag within the tub T.

In the drawing the rod 2 is shown in a vertical position which indicates the mean reading on the scale corresponding to such vertical position, which is due to the respective position of the journal 4 in relation to the rod. The centers of the three pivotal points 4, 12 and 18 are in the same vertical line. Upon the pivot 9 is secured a crank arm 23 to which is pivoted one end of a connecting rod 24, the other end of which rod is pivoted to a second crank arm 25, and this arm 25 is rigidly attached to a recording arm 26, the pen or pencil of which is adapted to bear upon and leave its mark upon the graduated dial 27 as it is rotated by the usual clockwork provided in such apparatus.

In Figs. 4 and 5, B is the beater "roll" which, by its operation of beating the material, causes the paper stuff to continuously flow around the mid-feather M in the direction indicated by the arrows, due to the angle at which the partition or backfall P is placed in relation to the beater B. The drag 1 may be swung upward out of the tub T, upon the shaft 7, or otherwise raised, while the tub is being emptied and a new charge put in.

Ottawa Notes

Ottawa, Ont., March 25.—Alterations in the rates on news print from Ottawa, Hull, Grand Mere, Shawinigan Falls and other points from which pulpwood is shipped to Brandon, Winnipeg and other Western points has been made by the Railway Commission. Responding to an application by the Brandon Board of Trade, which complained that while Winnipeg enjoyed a commodity rate on news print Brandon did not, the Board took up the matter and as a result the rate to Brandon has been reduced from 81 cents to 75 cents per hundred miles while the rate to Winnipeg has been increased from 61 cents to 63 cents. The new commodity rates have been based on the 5th class rate from Fort William plus 15 cents from Sault Ste. Marie, Espanola and Sturgeon Falls and 25 cents from Ottawa, Hull, Grand Mere, Shawinigan Falls and Windsor Falls.

* * *

Shipping facilities will be furnished for a district rich in pulpwood owing to the decision of the Government to provide a limited operation of the National Transcontinental Railway between Winnipeg and Moncton. The announcement of the refusal of the Grand Trunk Pacific to take over the road and of the intention of the Government to partially operate it was made in the Senate a week ago. The matter has been the subject of debate during the previous week, some senators having claimed that there were thousands of cords of pulpwood which would be shipped to Quebec pulp mills if the shipping facilities were afforded, while others had contended that it would be economically impossible to ship pulpwood in this direction. Last week Senator Casgrain of Montreal stated that the pulpwood could be taken by train over the N. T. R. from the Abitibi district to the headwaters of the St. Maurice river and then floated down to the mills. The debate finally concluded with the announcement by Senator Lougheed, Government leader in the Upper Chamber, that the Government itself would operate the line before spring. A Bill which as originally drafted would have proved a source of menace to the pulp and paper industry in Canada has been amended according to the dictates of common sense by the special committee to which it was referred and will shortly come before Parliament. This is the bill introduced by Mr. George H. Bradbury to prevent the pollution of navigable waters. It would have heavily penalized lumbermen, paper mill operators and others who allowed sawdust, chips, or any effluent to be discharged into navigable streams or streams flowing into them, in any part of Canada. This would have worked unnecessary hardship in thinly settled portions of the country where pulp mills are established but as amended the bill will only apply in areas designated by the Government which will in effect mean in thickly settled districts.

* * *

The Upper Ottawa Improvement Company has filed its 1915 scale of rates to be charged to lumber and paper companies on the Ottawa river making use of its facilities. On the whole the rates show an increase. As compared with 1914 the tariff is as follows: Tolls, 6 rates greater, 2 less and 3 the same as in 1914; towing, driving and sweeping, 10 rates greater, 4 the same as 1914; boom working and driving, 7 rates greater, 1 less, 2 the same as 1914; towing, 10 rates greater, 1 less and 1 the same as 1914; towing per hour, 7 rates same as 1914.

* * *

The announcement in Parliament by Sir George Foster last Monday that Canada might succeed in arranging a preference with Cuba is one of considerable interest to the pulp and paper trade in the Dominion. Among Cuba's imports paper products largely figure. Hitherto she has imported largely from the United States but with a preference arrangement with Canada it is confidently expected by Canadian paper manufacturers that the Dominion might capture a large part of this trade.

* * *

Whether or not paper is a suitable material for use in the manufacture of strong boots has been a feature of the inquiry into the military fotwear served out to Canadian contingents, now being conducted at Ottawa by a special parliamentary committee. Statements had been made, in commendation of the boots in question, that their soles contained paper. It has been brought out in evidence that the "paper" is leatherboard which is used in connection with the steel shank placed in most of the boots manufactured for the troops. The fact that this material is quite generally used in high-grade boots proved a surprise to the committee and to the public who had first imagined that when the boots contained paper they condemned themselves. However, the fact that light is coming on this subject was proved at yesterday's meeting of the committee when Mr. F. B. McCurdy one of its members, pointed out that the Japanese, who were ranked as progressive people, had used paper footwear in the Russo-Japanese war with alleged good results.

The Hungerford Talc Co., Limited, has been granted a provincial charter, with a share capital of fifty thousand dollars and head office in Toronto. The incorporators are H. B. Hungerford, M. B. Orde and E. J. Durkes of Chicago, David Plaut of Kansas City, Mo., and Wm. H. Wallbridge, of Toronto. The powers of the new company are very wide, and deal principally with the development of mines and mineral lands.

The Markets

CANADIAN MARKETS

There is not much new or interesting to report in the paper market, except that news print is rather easy in price, and some of the larger mills are not as busy as they have been. It is said in some quarters that the demand has fallen off by about twenty per cent at home and abroad, owing to the reduced size of newspapers, and the decrease in advertising. However, a better feeling is prevailing in the publishing business, and as soon as the Easter holidays are over and business gets off well to a spring start, it is believed that there will be a decided improvement. Some mills are receiving inquiries from England regarding prices, etc., but so far no large contracts have been closed.

Book and writing plants are doing a fair business, and printing establishments are growing busier. The recent small increase in price on book, bond, writing and ledger paper, owing to the war tax on raw materials has been accepted by the trade without any serious protest. Coating paper plants report that business has picked up considerably. There is no change in the ground wood situation, as water conditions across the border are very satisfactory at the present time. The sulphite outlook is full of uncertainty, and it is expected that prices, which have been easy for a considerable time, may take on a firmer tone. The foreign supply is reported to be growing less and, with restricted receipts, the demand may become keener and prices rise. Wrapping paper mills are running at low production, and there is not a great deal of life in the trade. Jobbers report that business is only fair, although there is steady demand for kraft. In some grades of the raw and paper stock line there is a slight improvement, but the spring business has not opened up fully yet and buying is in small lots. There are no noteworthy changes in prices to record. Manufacturers in all lines are hopeful, and look for a better state of things in the near future.

Quotations, f.o.b. Toronto, are:—

Paper.

News (rolls), $1.90 to $2.00 at mill, in carload lots.
News (sheets), $2.05 to $2.15 at mill, in carload lots.
Book papers (carload), No. 3, 4.00c to 4.25c.
Book papers (ton lots), 4.25c to 5.75c.
Book papers (carload), No. 2, 4.50c.
Book papers (ton lots), No. 2, 4.75c to 5.50c.
Book papers (carload) No. 1, 5.00c to 5.50c.
Book papers (ton lots), No. 1, 5.50c up.
Sulphite bond, 6½c. to 7½c.
Writings, 4½c up.
Grey Browns, $2.35 to $2.75.
Fibre, $3.35 to $4.00
Manila, B., $2.85 to $3.25.
Manila, No. 2, $3.10 to $3.50.
Manila, No. 1, $3.35 to $4.00.
Unglazed Kraft, $3.90 to $4.50.
Glazed Kraft $4.25 to $5.00.

Pulp.

Ground wood pulp (at mill), $16 to $17
Ground wood, $21 to $23, delivered.
Sulphite (unbleached), $3[illegible] to $41 del. in Canada.
Sulphite (unbleached), $40 to $44, delivered in U.S.
Sulphite (bleached), $5[illegible] to $58.

Paper Stock.

No. 1 hard shavings, $2.05.
No. 1 soft white shavings, $1.70.
No. 1 mixed shavings, 50c.
White blanks, 97½c.
Heavy ledger stock, $1.50.
Ordinary ledger stock, $1.30.
No. 2 book stock, 50c.
No. 1 book stock, 75c.
No. 1 Manila envelope cuttings, $1.20.
No. 1 print Manilas, 65c.
Folded news, 32½c.
Over issues, 40c.
No. 1 cleaned mixed paper, 25c.
Old white cotton, $2.50 to $2.75.
No. 1 white shirt cuttings, $5.75 to $6.00.
Black overall cuttings, $1.70.
Thirds, blues, $1.50.
Black linings, $1.75.
New light flannelettes, $5.00.
Ordinary satinets, 95c.
Flock, $1.05.
Tailor rags, 90c.
Manila rope, 2c to 2¼c.
No. 1 burlap bagging, 90c.

Quotations f.o.b. Montreal are:—

Book—News—Writing and Posters.

Roll News, $40 to $43 per ton for large orders; $45 to $50 per ton for small orders.
Ream News, $45 to $47 per ton for large orders; $50 to $60 per ton for small orders.
No. 1 Book, 5¼c to 6c per lb.
No. 2 Book, S.C., $4.50 to $4.75 in large quantities; $4.75 to $5.50 in small quantities.
No. 3 Book, M.F., $4.00 to $4.25 in large quantities; $4.40 to $4.50 in small quantities.
Writings, 5c to 7½c.
Sulphite Bond, 6½c to 8½c.
Writing Manila 5c.
Colored Posters 4c. to 5c. per lb.

Wrappings.

Grey Brown, per 100 lbs., car lots, $2.25 net; 5 tons $2.45; 2 tons, $2.55; 1 ton, $2.65; less, $2.75.
Red Brown, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, 3.15; less, $3.25.
B. Manila, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, $3.15; less, $3.25.
No. 2 Manila, car lots, $3.10; 5 tons, $3.20; 2 tons $3.30; 1 ton, $3.40; less, $3.50.
No. 1 Manila, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton, $3.65; less $3.75.
Kraft, $3.75 to $5.00.
Fibre, car lots, $3.25; 5 tons, $3.45, 2 tons, $3.55, 1 ton $3.65; less $3.75.
Fibre, $2.75 to $3.50.
Manila, B., $2.50 to $3.25.

On large orders to the jobbing trade some manufacturers are quoting 10 per cent off the above prices on wrapping.

Pulp.

Sulphite easy bleaching, $43 to $45 per ton
News quality, $41 to $42 per ton
Bleached sulphite, $54 to $59 per ton

Kraft pulp, $3.60 to $4.00.
Ground wood, No. 2, $22 to $24, delivered United States.

NEW YORK MARKETS

(Special to Pulp and Paper Magazine)

New York, N.Y., March 25, 1915.

Mild weather in the eastern states during the past month has brought about somewhat of a change in the market for mechanically ground wood pulp. With a plentiful supply of water, mills have been enabled to grind all the pulp they want for their immediate use and operations on all sides are steady. The only activity in sales, however, is among those mills that are either looking forward to a shortage during the coming summer months, or those that do not grind pulp for their own use. As far as prices are concerned, they are somewhat stronger than they were a month ago, No. 1 quality selling at the mill at about $17.00 per ton, while the second grade is about $2.00 cheaper. There is a strong feeling prevailing among local distributors that these values will be increased before the summer season sets in.

In discussing the Chemical Pulp market this week a leading importer stated to your correspondent that it would not be very long before the consumers in this country would awaken to the true situation. That foreign makers will raise their prices is more than evident. So far reports from Scandinavia state that such is the case there, and unbleached sulphite is reflecting a stronger tone here during this week, while bleached sulphite is looking decidedly upward. At present the mills appear to be well supplied with stocks, and in consequence there are very few inquiries for additional supplies—the principal movement being confined almost entirely to contract shipments. Though imports have shown a slight decrease since the war began, it is stated on good authority that there are plenty of supplies on the docks at the various ports of entry.

Mills are showing very little inclination to purchase either rags, waste papers, or bagging. In the case of rags, roofing stocks seem to be about the only grade reflecting any activity. These lines are maintaining good values, and it is the concensus of opinion that other grades will be on a much firmer basis before the Spring is far advanced. Though stocks of gunny are rather limited, there is very little activity reported in local circles. Waste papers continue to be slow, though prices are firming somewhat. Soft white shaving have advanced slightly during the interval, and are now quoted at about $1.80. Hard white shavings can be had anywhere from $2.15 to $2.60, according to quality. Mixed papers are plentiful and weak in price. Though dealers are asking $1.25, it is reported that certain parcels were disposed of this week, as low as $1.15. This movement, however, is probably due to the desire of the packer to turn part of his heavy stocks into ready money.

A pleasing feature about the general paper market in this city is the firmness in which prices on all grades are being held. Though buying has been, and is, very spotty, there is a very strong undertone and very little cutting is reported in any quarter. Reports from various large paper centres indicate that the situation in New York is a criterion of the paper distributing industry of the United States. Leading newsprint manufacturers report steady flow of inquiries for additional supplies, but in most cases when the orders are placed they are for only small lots. The supply on hand at the mills is comparatively heavy, though the movement is steady. Prices on side run news are very firm under a fairly good demand. The improvement in the movement in book papers noted in the last issue of the Pulp and Paper Magazine appears to have slackened, as both the leading manufacturers and jobbers now say that buying is very dull along this line. Considerable amount of business was placed during the interval in the various grades of tissues, and the market, which two weeks ago was dull and uninteresting, is now showing signs of life, and assuming more steady tendencies. A month ago sales were frequently reported at 37½c and 38c for No. 1 white tissue, but now a skirmish of the market fails to reveal anyone selling below 40c for carload quantities, and 42½c in small lots. Kraft papers, both domestic and foreign grades, are maintaining their own under the influences of a steady demand, and fairly good prices. Though the board market is still weak and uninteresting, there is a slight tendency towards an improvement, and manufacturers are hopeful that the return to normal conditions will be earlier than was at first anticipated. Taking everything into consideration, the local paper market is by no means bad, and compares rather favorably with corresponding periods in previous years.

Pulps.

Ground Wood, No. 1, $20 to $21, delivered.
Ground Wood, No. 2, $18 to $19, delivered.
Unbleached Sulphite, dom., 2.20c to 2.75c, delivered.
Unbleached Sulphite, imptd., 1.80c to 2c, ex dock, New York.
Bleached Sulphite, domestic, 3c to 3.40c, delivered.
Bleached Sulphite, impt., 2.60 to 2.90, ex dock, N.Y.
Easy Bleaching, impt., 2.05c to 2.15c, ex dock, N.Y.
Unbleached sulphate, impt., 1.80c to 2.05c ex dock N.Y.
Bleached sulphate, impt., 2.75c to 2.90c, ex dock, N.Y.
Kraft Pulp, 1.80c to 1.95c, ex dock, New York.

Paper.

News, rolls, transient business, 2.10c to 2.15c, f.o.b.
News, rolls, contract renewals, 2c to 2.10c, f.o.b.
News, side runs, 2c to 2.05c, f.o.b. New York.
News, sheets, 2.20c to 2.35c,f.o.b. New York.
Book papers, car lots, M.F., $3.75 to $3.90 f.o.b.
Writing paper, extra superfine, 13½c to 17c, del. east of Miss. River.
Writing paper, superfine, 11c to 13c, del. east Miss R.
Writing paper, No. 1, fine, 9c, del east Miss. River.
Writing paper, No. 2, fine, 8c del. east Miss River.
Writing paper, engine sized, 5c to 8c, east Miss. R.
Bond paper, 5c to 24c, delivered east of Miss. R.
Ledger paper,5c to 25c, delivered east of Miss. R.
Linen paper, 8c to 18c, delivered east of Miss. River.
Manila jute, 4¾c to 5c, delivered.
Manila, wood, 2.30 to 3c, delivered.
Kraft, No. 1, (dom.) $3.60 to $3.75, f.o.b. New York.
Kraft, No. 2, (dom.) $3.35 to $3.50, f.o.b. New York.
Boxboards, news, $23 per ton, delivered.
Wood pulp board, $40 per ton, delivered.
Boxboards, straw, $21 per ton, delivered.
Boxboards, chip, $22 per ton, delivered.
Tissue, fourdrinier, 50c f.o.b. New York.
Tissue, white, cylinder, 40c to 42½c, f.o.b. New York.
Kraft, imported, 3.95c to 4c, ex dock, New York.

THE BRITISH MARKETS.

(Special to Pulp and Paper Magazine.)

London, March 20, 1915.

The British paper industry is at present in a dull state. From nearly all sources come reports that business is slack and orders scarce. No doubt a re-action has set in after the rush experienced between September last and January for newsprint and added to this there is the fact that stocks in the consuming channels are plentiful. In nearly all cases newspapers have got back to their normal size again, and the large supplies laid in when war broke out in August must first of all be cleared out of the way, now that an idea of the market and the condition of the mills for future production can be accurately gauged. Esparto paper mills are working on half capacity, and are very hard hit by the present condition of shipping tariffs, which are impeding the arrival of the raw material from abroad. Fine printing papers are having a good outlet and so is writing paper, but things are not up to the satisfaction of mill men. Wrapping, packing and paper hangings are moving slowly, and mills engaged in these grades of papers complain of dullness. Promoters of the "Made in Canada" scheme will be interested to learn the Paper Mill Workers' Union in London is devoting particular attention to "Union Label Paper." They are calling upon all houses where union men are employed to handle nothing but "union label paper," which is made in Great Britain. About ten mills are producing the paper, and the union officials could, and are taking, advantage of the war feeling to press home their policy. Their policy is "No foreign paper"—it must be all British made, and made by union label. The movement is gradually becoming successful. Prices of papers remain unchanged, a grievance which producers do not know how to tackle.

* * *

The pulp markets have become more settled, but prices are higher within the last couple of weeks. There is also a demand for sulphite, but sulphate is slow in moving. Ground wood has also received some attention, and some small parcels have changed hands. Scandinavians report that they have closed small business transactions with English buyers. Easy bleaching going at $46 to $47, and strong sulphite at $44 to $45. Prices c.i.f. British ports are now about as follows (but shipping tariffs are the governing factors in all transactions):—

Bleached sulphite, $59.60 to $67.20.
Sulphite, easy bleaching, $48.60 to $51.20.
News quality, $40.80 to $42.
Unbleached sulphate (No. 1), $46.40 to $47.60.
Kraft pulp $40.80 to $42.
Ground wood, $13.25 to $14.
Ground wood, dry, $26.40 to $27.

* * *

In the absence of important business, quotations for esparto are nominal. Steamers are very scarce. During February, [illegible] tons were imported from all esparto centres, compared with 16,111 tons in February, 1914. German straw pulp being now out of the market, Dutch pulp is in demand and prices have risen by $1.50. Rags are becoming scarcer, and prices in the near future are bound to rise. At present foreign collections reaching the British consumer are a few cents dearer.

* * *

In the chemical market orders are brisk. Alum is dearer and sulphur is in the same category and scarce. Prices of other commodities are as follows:—Caustic soda, 76 per cent $44.40 to $50 per ton, f.o.b.; 77 per cent $44.50 to $45.60; 70 to 72 per cent, $40.80 to $46.80; and 60 to 62 per cent, $26 to $28. Sulphate of soda (saltcake) $10; amomnia alkali, up to $18 for shipment to stated ports. Bleaching powder $43.80 to $44 per ton in 3 cwt. hardwood casks and about $1 cheaper in 3¼ cwt. drums, f.o.b. Liverpool. Oxalic acid is now 22 cents per lb. China clay is receiving only moderate attention. Other fillings are unchanged, except for export when a tariff rate is slapped on the price.

* * *

The exports to Canada and imports from Canada during the past two weeks have been as follows:—Exports to Canada: printing paper, 196 cwts.; writing paper, 22 cwts.; paper hangings, 5 cwts.; other kinds of papers, 24 cwts. Imports from Canada: 32 bales of coated paper and 5,186 cwts. of wood pulp boards. During February, British mills exported to Canada 159 cwts. of writing paper, as against 368 cwts. in February, 1914, $4,619 cwts. of printing paper (as against 4,983) and 130 cwts. of other kinds of paper (as against 260 cwts.).

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The New Brunswick Situation.

New Brunswick should accept philosophically the fact that the embargo on pulpwood has not brought into the Province any more paper mills. Conditions are not such as to warrant new establishments in any quarter of the Dominion. It will be some time before the mills already in existence will be working to full capacity, and a prohibition of export of the principal raw material has just now no necessary connection with new enterprises. New Brunswick can rely upon it that if she will pursue a policy of careful husbanding (not necessarily hoarding) of forest resources her opportunity will come. She will be able to command the attention of some of the greatest enterprises in the world.

The announcement by the Surveyor-General of New Brunswick that "The Government intends to look carefully into the large quantities of pulpwood exported from the Province and will put an end to the cutting of undersized timber by cancelling the licenses of those parties found guilty of the practice" will be greeted with approval by all interested in the development of the Province's resources providing the Surveyor-General understands exactly what he means by "undersized." New Brunswick is one of the Provinces in the Dominion which need to take a page from the scientific forestry methods of Germany, the United States and British Columbia. Under certain conditions to leave small timber standing is as wasteful as to burn it. We believe that a new paper mill in New Brunswick just now would not be a good thing, either from the standpoint of the promoters or of those already in the paper business.

"The time will come," and meanwhile New Brunswick should make the very most of its natural resources by applying every principle which scientific forestry can advance. We are sure the University of New Brunswick with its forestry experts will not fail the Province in its hour of need.

Be Careful!

If we could only have some such words as the above flash through the mind of every camper as he builds his fire or leaves camp; of every smoker as he lights his pipe, knocks out the "heel" or throws away a cigarette stub; of every settler as he burns his brush; of every engineer and fireman operating traction or donkey engines in forest areas; above all of the men engaged in building new railway lines through our north country, the country would probably be richer by some millions of dollars annually.

The time of annual danger is now here. This warm spring sunshine will dry out the grass and slash, and the conditions for forest fires will be ideal. But the fire, by about a million chances to one, will **not** come unless **somebody** starts it. It is true that lightning has been the cause of fires but very rarely. We have also tried to pass on the responsibility to broken bottles, spontaneous combustion and other "causes" which might at some time serve for sermons or idle speculation. But the forest fire is practically always the result of man's carlessness. The Pulp and Paper Magazine urges every reader to do everything in his power to assist the rangers, forest protective associations, and himself by being careful of fire in the woods, and by encouraging others to do the same.

Freight Rates

Unfortunately the date of issue of the Pulp and Paper Magazine practically coincides with that of the sittings called by the Board of Railway Commissioners to give further consideration to the application of the railways in Eastern Canada for an increase in freight rates. At this meeting it is expected that the pulp and paper interests will be heard from. The Canadian Pulp and Paper Association has secured statistics from its members which should go far to show how disastrous to the industry would be the effect of any such tax as the railways propose.

There will be time enough to comment later, when the case is further advanced. Just now the attitude of the Government counsel, quoted in these columns a month ago, still appears to be the only tenable one. The railways have made a most extraordinary request at a most opportune time. It might be added that so far, the task before the railways, as stated by the Chief Commissioner in Montreal, viz., that they must show, in the first place, that they need and are entitled to an increased revenue, and in the second place, that the proposed means of augmenting revenues is just, is very far from accomplishment. Practically nothing has been advanced to prove that the increase is justified. So far as the public is aware, the railways have not demonstrated that their earnings are seriously diminished, and still less does it appear that the reserves and assets are in jeopardy.

The case is likely to continue for some time. There will be much debate and much room for comment at a later date.

Paper Textiles

An investigator had just been shown through the plant of a manufacturer of paper textiles. He was delighted with all he saw and was thanking the manager as he passed out of the richly-carpeted office. "You have a wonderful plant, Mr. A. . .; but when you can make a carpet like this on which we are standing, from paper, you will have accomplished something." "Well, I'm happy to say that this carpet is our own manufacture," said the other.

The conversation fairly well represents the status of the paper textile industry in the United States. Marvellous advances are being made in the use of paper for all kinds of wall coverings, carpets, burlaps, coffee bags, curtains and even clothing. A one-hundred per cent paper carpet backing is a common thing. A cloth made of seventy-five per cent paper is one of the samples in the collection of a New York chemist. The remarkable feature of it is that it has been boiled and washed with soap. Curtains of woven paper look every bit as good as the cotton article, and a wrapping of paper woven into burlap carried a heavy consignment from Europe to Chicago and back to New York. The net saving of hemp, jute and cotton in a great number of important textiles is fifty per cent, and the net saving in cost of manufacture twenty-five per cent.

The textile field is one to which paper manufacturers can address themselves with great profit. European investigators have made wonderful advances along these lines. The day when cotton, jute, hemp and even linen and wool are required without admixture of less valuable fibres is rapidly passing. Paper will enter more largely than ever into the textile industry.

British Dyes, Limited

The British dye scheme has not succeeded very well. It is true that the course of "British Dyes, Limited," through the House of Commons was a pretty rough one. From many sides it was assailed as impractical, incomplete, uneconomic, and unbusinesslike. Critics from many walks of life took a shot of disparagement at the proposal. It would now appear that in the supreme test of the plan—the treatment of its securities by the financial public—has found it wanting.

The promoters of dye industries in the United States and Canada will doubtless be disheartened at this downfall. Far from meaning that the lack of success in Britain will give increased opportunities here in America the situation will indicate clearly to the shrewd American manufacturer that the problem which he is trying to solve is a foeman worthy of his keenest steel. Dr. Arthur D. Little, in an address printed in the last issue of this magazine, emphasized the point that there has never been a genuine appreciation of industrial research. In the failure of the British dye scheme his contention is, to our opinion, borne out. In the dye industry at least, England has not applied her chemists as the industry demands. If dyes are ever to be made extensively in Great Britain or the United States there must be the backbone of scientific research which has been developed on the Continent.

And every industry which has pretensions can learn from the same example. There must be long studious effort to consummate any great industrial achievement.

NOTES ON ACID PLANTS

By LEO SCHLICK, M.E.

(Continued from April 1st issue.)

The pyrites burner illustrated in Fig . 6 is the typical arrangement for the burning of larger lumps, and represents one of the first burners largely used in the chemical industry. It is composed of a series of grates formed by square iron rods and spaced so as to allow for the proper admittance of air, and for the removal of the cinders. For the latter purpose each bar is easily turnable by means of a crank provided with a handle. On the top of the main chamber a lower chamber is arranged in order to take care of the sublimate derived from the roasting. The sublimate is evaporated by means of the heat generated by the combustion. This chamber also retains the coarsest of the dust.

Each one of the top compartments is provided with a valve for connecting or disconnecting them with the flue-dust and combustion chamber. The lower compartments are sufficiently roomy to take care of an accumulation of cinders. All the compartments are accessible by sliding and swing doors.

Before operating these pyrites burners are heated by a strong fire until the brick walls are thoroughly hot. In the course of this process the burner is connected to the chimney, whilst the valve leading to the absorbers is closed. When the chambers are sufficiently hot, the ashes from the fire are removed, a heavy layer of pyrites is charged into the main chamber and as soon as the combustion within the furnace has made sufficient progress the valve leading to absorbers is opened and the chimney draft is cut off by closing the valve. The proper amount of air is admitted through the sliding doors of the cinder compartment. With this class of burner a certain amount of manual labor has to be expended for the breaking up of the pyrites on the grates and the turning of the grate bars from time to time so as to maintain a proper combustion.

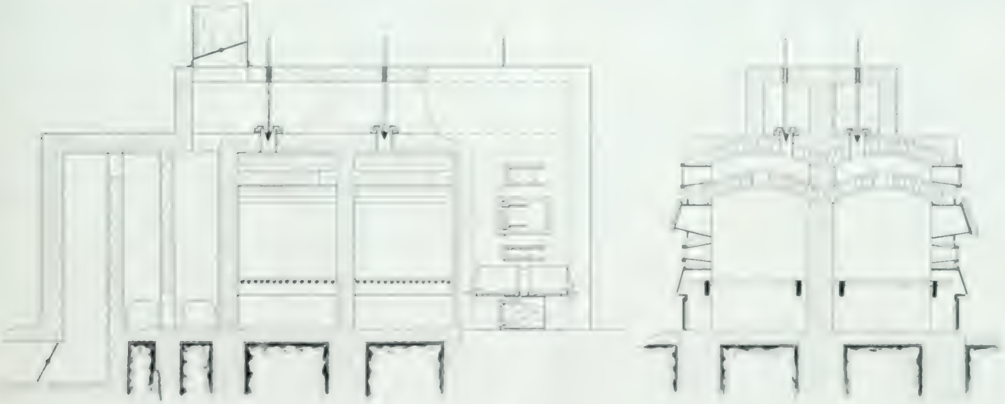

Fig. 6.

Owing to the spaces between the bars it is not possible to obtain a high efficiency when roasting lumps of a small size. Before the construction of a special burner for this purpose was known, efforts were made to burn the pyrites by mixing it with clay, drying it afterwards, and roasting it along with the larger lumps. In order to ensure a better efficiency and to eliminate such extra labor, vertical burners have been used. One of these is illustrated by Fig. 7. Here the pyrites, having been crushed to a suitable size, was charged into the burner by means of a funnel, and the attendant had to propel the material from stage to stage until it reached the outlet.

It is evident that a good deal of air entered the burner under this plan, which not only gave a weak gas, but facilitated the formation of trioxide. These disadvantages have successfully been overcome by the American Herreshoff, whose burner is sketched in Fig. No. 8.

Whilst in this design the old idea (Austrian, I believe) of the storeys or stages is maintained, the propulsion of the pyrites is effected by means of scrapers secured to a vertical shaft. Owing to the particular shape of these scrapers they not only mix but propel the pyrites slowly, the motion being effected by a bevel gear and a countershaft. The crushed pyrites is charged into the upper stage and is gradually conveyed to the lowest stage. In this way it is gradually roasted and leaves the burner with $1\frac{1}{2}$ per cent to 4 per cent of sulphur in the cinders. As the air enters on the bottom, the process of roasting and generating gas acts in the counter current style in respect to the work performed and thus the gases will become strongest when leaving the burner for further treatment.

Since the introduction of the burners for pyrites of small sized grain, it has been possible to produce a relatively strong gas with a material so difficult to handle. It is to be understood that pyrites yields a weaker gas than sulphur on account of the larger amount of air required for roasting. Approximately, one can say, $2\frac{3}{4}$ atoms of oxygen are required for every atom of sulphur contained in pyrites.

It must be remembered that the strength of a pulp manufactured is in indirect proportion to the strength of the acid used. This means that the relatively weaker an acid in conjunction with a relatively longer cooking time, the stronger a pulp obtained, and vice versa. Therefore, mills being equipped with an acid plant producing a relatively weak gas will automatically arrive at a longer cooking time, and in conformity will produce a stronger pulp.

It cannot be said, however, that a relatively weak gas should not give an acid relatively rich on free and low on combined, as there are many other seemingly simple but most important items which can compensate for a relatively weak gas, and there are others which may upset the action of a rich gas. We, therefore, cannot say that solely a gas of the highest percentage will give the best results, nor can we say that solely one certain acid system will produce satisfactory results. The purpose of an acid plant is to produce sulphur dioxide with the smallest possible amount of surplus air, trioxide and selenium and to absorb such gases in suitable contrivances in such a way as to obtain an acid low on combined and with the percentage of lime and free acid wanted. The efficiency of an acid plant is based upon the amount of sulphur, etc., used to manufacture a ton of air dry pulp. Where 10 per cent of sulphur is being consumed as an average one might safely say that this acid plant is as perfect as it can be, in consideration of the still incomplete theory of the recovery of sulphur from the waste liquor. When generating dioxide from pyrites it is advisable to employ a well-designed and well-dimensioned scrubber which will eliminate the greatest portion of the trioxide and the flue dust. As evidently the water used for cooling and washing will absorb a certain amount of dioxide it is advisable to cool the scrubber-water for re-use, providing the entering gases are still hot. Another very important item is the drying of the pyrites before being roasted. Sulphur as well as pyrites should enter the kilns as dry as possible, as moisture contained in either will be vaporized and form sulphuric acid in conjunction with the small percentage of trioxide which will always be present in the gases.

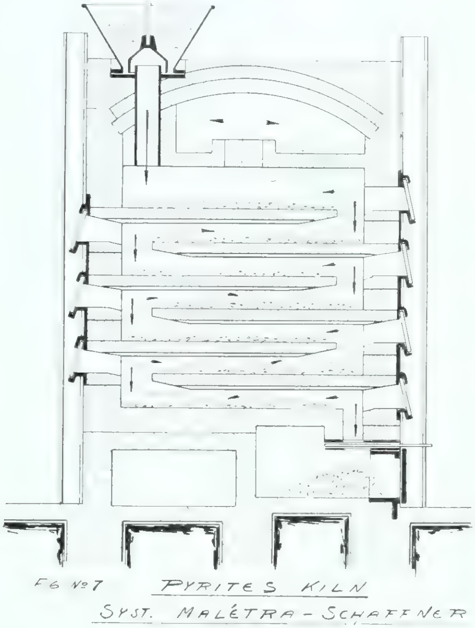

Fig. 7.

As previously mentioned, the sulphuric acid formed occasionally by irregularities, can easily be eliminated by conveying the gases through a closed vessel filled with water, containing a certain quantity of sulphuric acid in order to attract the sulphuric acid carried by the gas. The top of the flue dust chamber is often used for the drying of the pyrites, thus utilizing the heat generated by the combustion. Drying contrivances are fitted with scrapers, which move the material about for uniform drying.

An interesting question is the placing of the fan and the application of the forced or induced air-supply for the absorbers. Whilst the placing of the fans for acid plants working with towers and chambers is purely a mechanical one, the question about forced and induced air supply for the absorbers is an economical one. Where acid rich on free has to be produced the vacuum system for the gas supply for the absorbers should be avoided. This refers especially to the tank system, for it must be remembered that it is not possible to keep the maximum amount of free SO_2 in an acid when under a vacuum. Tank systems used for the manufacture of rich acids therefore should work with air compressors of the rotary or the piston type.

During the whole period of the development of the sulphite industry the gas cooler has been a neglected child. The pulp maker generally was glad if the cooler did not block unduly and did not bother much about the water and its velocity. In recent years the cooling question has been taken up again and we can say that improvements such as are embodied in Dr. Richter's cooler will certainly have an influence upon future acid making. A cooler should allow the regulation of the temperature of the gases at will, no matter what

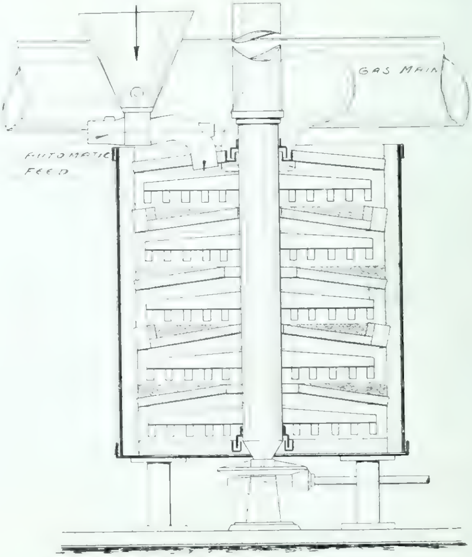

Fig. 8.

the outside temperature, and if this is accomplished, the practice of acid making will rest upon stronger supports than now. The regulation of temperatures at will is all one requires for the making of pulp, paper and chemical fibre.

Fig. 9 shows a cooler of the horizontal type constructed of 10 to 12 inch lead tubes. This size tube is quite customary as the cleaning out is largely facilitated on account of the large hand holes formed by the blind flanges on each end. These blind flanges are outside of the box containing the running cooling water. If there is little space for the installation of a cooler of the horizontal type a vertical one can be installed. When installing coolers it should be remembered that the cooling water should possess a maximum possible speed so as to increase the cooling effect and to reduce the quantity of water.

The following table demonstrates this. It refers to a cooler for the cooling of relief liquor, and may serve as an example on the question of cooling:

Velocity of the Cooling Water, ft. per second.	Cooling Surface Required, square feet.	Speed of Liquor in ft. per sec.	Length of pipe required ft.
13.3	115	6.7	110
10.0	123	6.7	119
6.65	142	6.7	138
3.33	190	6.7	184
1.77	230	6.7	274

This shows that the less the velocity of the cooling water along the pipes, the greater the cooling surface required. Gas and cooling water should run in opposite directions. This is called the "contra flow principle." Coolers should cool the gas down to a temperature as low as possible in order to ensure a proper absorption in the absorbers, for it must be understood that the higher the temperature of the gases entering the absorber the weaker will be the acid obtained. It therefore should be the aim of a sulphite mill to bring the cooling system up to the highest standard. The various troubles with the acid are generally located in the coolers. The broad significance of this is often not sufficiently recognized. When coming from the coolers the gas should pass through an efficient gas washer or scrubber so as to be cleaned and freed from impurities. This is particularly the case when burning pyrites, but sulphur-burning plants should not be without this useful and often misunderstood apparatus.

From the scrubber it passes along to the absorber of the tank or tower or chamber system. Each one of these has its peculiarities. Evidently the kilns, the piping, the cooler and the absorber create a resistance to the gases which has to be overcome. Likewise in the boiler plants we have to make the distinction between induced and forced draft. Whilst Dr. Frank and others preferred to feed the burners with compressed air and at the same time to force the gas through the absorbers, others have placed the whole acid system under vacuum. It must however be remembered that it is not possible to obtain an acid [illegible] as free as when working the absorbers under vacuum, and therefore the simplest and most effective plan is to have the burners, the coolers and the scrubber under vacuum and the absorbers under pressure. This does not apply to those plants where open Mitscherlich towers are still employed.

Differences in the pressure when employing the tower system is effectively obtained by fans. If fans are arranged before the coolers they are made of cast iron and are provided with watercooled shafts, as it is a peculiarity of SO_2 gas at a high temperature not to attack iron. However, as soon as it is cooled down to the temperature proper it will attack cast iron and steel readily and therefore fans placed after the cooler must be lead-lined.

Almost everywhere fans are arranged after the cooler as the volume of gas to be propelled is that much smaller. Such fans of course have to be well made, must have bronze or lead jacketed shafts and should either be run at a variable speed or be sufficiently large so as to allow for regulating the pressure by means of a damper. Particularly in towers, an occasional partial blocking-up will create additional friction which has to be overcome. Apart from this the quantity of gas charged into the absorbers should be regulated so as to facilitate the [illegible] of the [illegible]

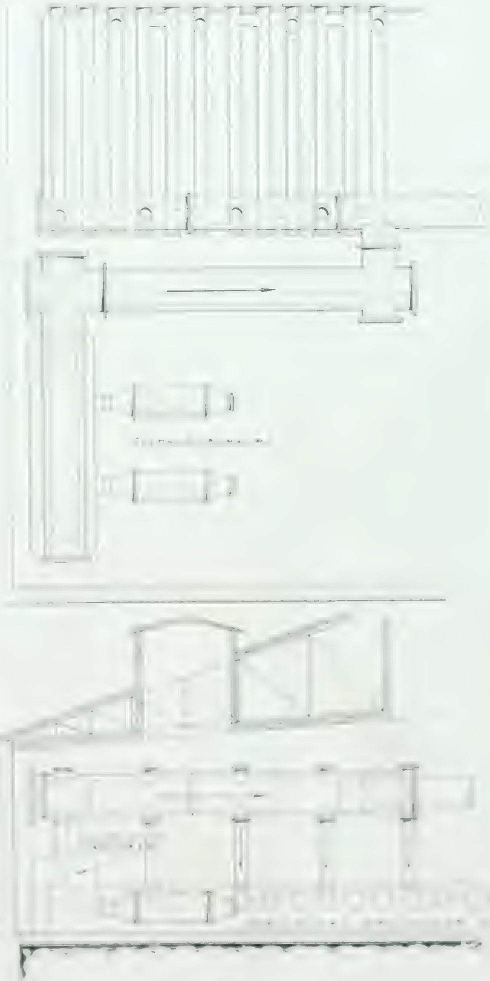

Fig. 9.

(To be Concluded.)

HYDRO-ELECTRIC POWER AT MONTREAL

By R. O. SWEEZEY, C.E.

(Special to Pulp and Paper Magazine)

The hydro-electric power situation in the city of Montreal and vicinity has become so pregnant with economic possibilities revealed by recent technical and scientific discoveries that the subject offers a most fascinating field for speculative study and profitable development. But the magnitude of the enormous undeveloped hydraulic energy that nature has placed at the city's very gates is inconceivable without some understanding of the physical features affording these possibilities, which, in many respects, are superior to those of the "far-famed" Niagara. Yet power generated by coal that is carried hundreds of miles from the mines largely exceeds the amount of hydro-electric energy used in the city of Montreal, an astonishing fact considering that more than one million two hundred thousand horse power of hydraulic energy is available most of it within twenty-five miles of the city. And despite the low cost at which that power can be developed, the large and growing industrial demand, and the rapidly increasing range of economic application made possible by scientific progress, there seems to be a lack of appreciative effort to commercialize this valuable product and render it adaptable to the new economic fields from which the community may derive benefits commensurate with the progressiveness of the age. How much that retardation of progress may be due to the monopolistic tendencies that have always prevailed in the power situation should be answered by the power interests themselves, since any lack of foresight on their part must, sooner or later react on their earning capacity.

With such hydraulic sources and the opportunities presented by such a market, Montreal should lead the world in a practical demonstration of the economies to be effected by a lavish use of electricity, which should be cheaper here than at any city on the continent, instead of being subjected to the unwise effort to maintain always the highest price that a tolerant public will stand. There are signs, however, that the power monopolists are beginning to see a faint glimmer of the possibilities awaiting a new policy, and if these hopeful signs develop into an intellectual capacity to measure the huge prospects before them, we may expect an early readjustment of prices followed by a campaign to educate the public to the economy to be effected by a wider and more intelligent appreciation of the application of electricity in the home, the factory, and on the railroad.

At the present time Montreal uses about one hundred thousand horse power of hydro-electric energy, which is supplied by the Montreal Light, Heat and Power Company from its several sources, chief among them being Shawinigan Falls, from which forty to fifty thousand horse power is transmitted some ninety miles to the city. The other sources, making up the remaining fifty thousand horse power, are Lachine Rapids, Chambly, and Soulanges Canal. The Canadian Light and Power Company also furnishes about eight thousand horse power to the Montreal Tramways Company.

Regarding the amount of steam power generated in the city, it is almost impossible to make a satisfactory estimate: that it is enormous may be judged by a view any day from Mount Royal, revealing the heavy pall of smoke that over-hangs the city and testifies to the immense coal consumption.

The modern technical economist cannot view such a situation without searching for the cause and seeking to direct attention to the obvious waste of opportunities. It may be that capital is lacking, or perhaps enterprise and confidence, but certainly blissful ignorance plays an important part. Something to awaken the "laisser-faire" attitude is urgently needed, and it is therefore with optimistic approval that we view the advent of Cedars Rapids Manufacturing and Power Company into the field with a capacity of one hundred and fifty thousand horse power generated at a point only about twenty-five miles from the city, at a cost so low that it is difficult to see how the power prices now in force can justly be maintained. Besides, such an increase of the commodity demands wider markets, and the first essential to these is more reasonable prices, leading to the more extended use of electricity in new and varied ways — many of them the marvel of yesterday but the common-place of to-day. Nor will the advancement cease with the common-place of to-day, for new marvels, the product of modern progress and ingenuity, are constantly being demonstrated and passed on as the common-place of to-morrow.

But Cedars Rapids Manufacturing and Power Company, with its one hundred and fifty thousand horse power, has only a small part of the available sources of supply. There is Shawinigan, with probably one hundred thousand h.p., Laurentide Company with ninety thousand horse power, Carillon Falls on the Ottawa, only thirty-five miles distant, with one hundred and twenty thousand horse power, and the St. Lawrence River (Coteau Cedars, and Cascades) rapids between Lake St. Francis and Lake St. Louis, within twenty-five miles of Montreal, capable of developing seven hundred thousand horse power. Of these, Cedars Rapids, Shawinigan Falls, and Laurentide have about two hundred and fifty thousand horse power, in addition to the one hundred thousand horse power now being used at Montreal, to throw into the market at once, leaving Carillon Falls and the Lake St. Francis to Lake St. Louis powers for future development. With a power output two and one-half times greater than the present consumption seeeking a market in this field, is it not reasonable to expect some radical changes benefiting the consumer. Whether the power monopolists realize it at present or not, they must soon face the situation in the proper mood, else powerful competitors may not be slow to realize the fact that there is such a quantity of undeveloped power available and offering as cheap development per unit as any large water power in America. Consider the St. Lawrence River, for instance, with a minimum discharge of 180, 000 cubic feet per second falling through a head of eighty-three feet, being the difference in level between Lake St. Francis and Lake St. Louis. This, under the available working head of seventy-five feet, would develope no less than one and a quarter million horse power. But as Cedars Rapids Mfg. & Power Company has rights to divert 56,000 cubic feet per second, to be used under a head of thirty-two feet as obtained at the plant at Cedars Rapids, and the Canadian Light and

Power Company has rights to divert some 14,000 cubic feet per second, the available minimum flow is reduced by some 70,000 cubic feet per second. Allowing some 10,000 cubic feet per second for Soulanges Canal and overflow, there is left 100,000 c.f.s. unharnessed and going to waste, except in so far as it affords a certain degree of excitement to tourists running the rapids in large steamboats. It is possible to divert this flow for a power scheme, provided remedial works are established to maintain the level of Lake St. Francis and also the in-take of the Cedars Rapids plant — conditions that are quite feasible.

As early as 1807, the Hon. Mr. Ellice, the then Seigneur of Beauharnois, realized the natural advantages afforded by the fact that the surface of Lake St. Francis is two or three feet above the level of the perfectly flat country lying between it and Lake St. Louis on the south shore of the St. Lawrence. (If it were not for an artificial dyke that is maintained at the lower end of Lake St. Francis, the St. Lawrence might very easily make a new channel for itself here.) The Seigneur of Beauharnois accordingly dug a small canal, 4 miles long, which is still in use, diverting water from Lake St. Francis to the little St. Louis River, augmenting its flow to increase the available water power for the old mill at the mouth of the St. Louis River, where it empties into Lake St. Louis, some seventeen miles from Lake St. Francis.

Owing to the extraordinary features of the country in this locality—sloping less than one foot in a mile—the ideal nature of the clay and the fact that about seventy-five feet, of the total eighty-three feet difference in level between the two lakes, is obtainable in a perpendicular drop at Lake St. Louis, a canal to divert any quantity of water from 20,000 to 100,000 cubic feet per second from Lake St. Francis can be built to serve the double purpose of navigation and production of hydro-electric power. Two locks, both together at the lower end of the canal, where solid Potsdam sandstone offers excellent foundations and materials for abutments, could take the place of the several locks now used at the Soulanges Canal, and although this south shore route would be four or five miles longer, the time of passage would be shorter than via the thirteen miles of the Soulanges canal with its several locks and restricted channel. When the St. Lawrence canals are deepened to conform to the dimensions of the New Welland Canal now being built between Lakes Erie and Ontario—an undertaking that must inevitably come about—the proposed route of this power canal is the only one that can be used with economical results, and the contribution to the cost of the canal as afforded by navigation purposes would so reduce the cost per horse power of developed energy as to render this the cheapest perhaps of any large power development in America.

This scheme is not merely the product of a fertile imagination, but has been studied by capable engineers whose estimates all agree as to the extraordinarily low cost.

That there would be other important factors of consideration in an undertaking that involved the diverting of more than half the St. Lawrence from its natural channel is patent to anyone, but the several engineers who have carefully studied the situation concur in the opinion that there are no physical obstacles to the scheme. Of course, "shooting the rapids" would no longer be possible over the Coteau, Cedars, and Cascades, and no doubt there would be many opponents to ably resist any such project regardless of the requirements of technical and commercial progress. They probably would oppose a diversion of the St. Lawrence by the principle of reasoning peculiar to the sentimentalists, who would prevent the utilization of the wasted energy of Niagara Falls without realizing that too high a price may be paid for mere aesthetic beauty. How long the community must wait for the proper initiative leading to a fuller application and use of such vast latent wealth is not very clear, except that there are certain encouraging features indicated by the low cost of development and the confidence of those whose money is being invested in further power projects.

Owing to the many economic uses now possible with improved electrical devices, the power companies should have a greatly increased revenue with slight additional fixed charges, but their price schedule unfortunately must, for some time at least, be dependent upon their method of reasoning and not necessarily governed by the logic of the situation. Recent prices quoted by the Cedars Rapids Manufacturing and Power Company strengthen the belief that, with a realization of the unlimited field before them, the power distributers are likely to respond to the demands of modern progress and at once set about a readjustment of prices adaptable to new circumstances, thus wisely anticipating conditions beneficial alike to themselves and the community.

Consider electrical cooking, which, though in some localities less favorably endowed with power than Montreal, is considered an expensive luxury, has in some places become part of the daily routine in homes where economy is the first consideration. A recent issue of the Electrical Times (Toronto) has this to say:

> "There are now many localities in Ontario where the ultimate price of electric current to the consumer is less than one cent per kilowatt hour. . . The system of charging that has recently been adopted by the Hydro-Electric Power Commission of Ontario is highly commendable in this respect. . . . To this end the rates have been so adjusted that it is in the consumers' interest to make as liberal use as possible of all the various little luxurious utilities now available for the home.
>
> "Electric Toaster.—The average toaster requires about five minutes to make the first two pieces of toast and another five minutes to make the next four pieces. Suppose the average requirement is six pieces of toast. This means 10 minutes' use of about 500 watts. Counting 30 days, this toaster will be used 300 minutes, or five hours per month and consume therefore 2,500 watt hours, or 2½ k.w.h. This means that the cost of a toaster which produces six pieces of toast every morning is only 2½ cents a month. If the toaster is used longer each morning, it will be still more economical.
>
> "Electric Coffee.—A coffee percolator large enough for the average family consumes approximately 500 watts. The coffee begins to percolate in this utensil in 9 minutes after the current is turned on, and probably gives the best results after 10 minutes, or at most 15 minutes. This means eight mornings before 1 k.w. hour has been consumed, or a consumption of about 4 k.w.h., costing 4 cents per month.
>
> "Electric Stoves.—Instances of this sort might be quoted at great length. A small hot plate uses approximately the same amount as a toaster or electric iron, and can be used to fry bacon or at-

> tend to any of the minor details in the preparation of our three meals a day. A tea samover consumes, again, about the same amount, and would be required only for about 10 or 15 minutes at a sitting. Electric kettles with self-contained units use about 500 to 600 watts and raise water to the boiling point in about 10 minutes.
>
> ''It will be seen that the cost of the operation of household utensils has reached a point where it compares more than favorably with cooking by gas or coal. These utensils have the great advantage that they can be operated wherever, and whenever, it suits the convenience or whim of the person operating them. The ordinary breakfast will consist of, say, cereal, toast, bacon and coffee. The toast is made in 10 minutes on the table, at a cost, as shown above, of 1-12 a cent, the bacon will fry in five minutes at a cost of 1-24 cent; the cereal on a small hotplate which consumes less than 500 watts can be well prepared in half an hour at a cost of ¼ cent and the coffee percolated in 15 minutes for ⅛ cent. The total cost of cooking breakfast for an average family using these three utensils is, therefore, 1-12 plus 1-24 plus ¼ plus ⅛, equals ½ cent.''

In the same manner it is shown that an electric iron for the average home can be operated at a cost of four cents a month, and an electric sweeper at a cost of one cent a month. Writing recently for the ''Scientific American,'' Mr. H. C. Spaulding shows that for an average family a dinner, consisting of roast chicken, with brown potatoes, baked banana with rice, asparagus au gratin and blueberry cottage pudding, can be cooked for two and a half cents with electricity at one cent per kilowatt hour, and he also remarks that ''One peculiar feature of electric cooking, apart from safety (no matches, no leaky pipes, no open, but unlit, valves) is that cooking meats, etc., whether baked or boiled, the actual loss in weight or shrinkage is much less than when the cooking is done by coal or gas.''

With breakfast costing half a cent, dinner two and a half cents, and the evening meal, say, two cents, the average family cooking by electric current would cost five cents a day or $1.50 a month. Allowing for hot water and unforseen requirements would probably not increase the cost by more than $1.00 a month, but even allowing $3.00 a month for electric cooking compares favorably with gas or coal-fire cooking.

Is it not desirable, also, to have a more extended use of cheap hydro-electric power in the operation of railways? The time for such a move is perhaps not quite ripe, but signs are not lacking to indicate the nearness of the day when such a move may be undertaken on a large scale in Canada.

Engineers would dismiss the idea at the present time because of the burdensome first cost of equipment, particularly the outlay for sub-stations and the large losses sustained therein while converting high voltage alternating current to a low voltage direct current, a process that necessitates installation of motor-generator sets at every few miles along the line, because the comparatively low voltage direct current—in which form power is supplied to the trolley—has not a long range of transmission. In the converting process the motor receives alternating current from the main transmission lines and produces direct current by mechanically operating a D.C. generator, which, in turn, feeds the trolley wire or ''third rail.'' This operation results in a large loss of efficiency, so that the power available as D.C. becomes much less than the power fed to the sub-station as A.C. Right here scientific effort has been striving to improve conditions, and recent experimental results in the United States have proved so encouraging that many eminent engineers there look for an early commercializing of the so-called ''mercury arc rectifier,'' which hitherto has been known and used on a very small scale, to convert alternating current to direct current, with little or no loss. By the process, an alternating current is passed through a mercury conductor, called the arc, and emerges as direct current, the phenomena of changing the alternating current to direct current being performed by the mercury at an efficiency of over 98 per cent. The application of this principle to electric railways would revolutionize the present system and effect an enormous saving of power and equipment cost.

The unique advantages possessed by Montreal as a power centre should enable railways like the Canadian Pacific, Grand Trunk, and Canadian Northern to become leaders in the application of this principle, should it prove as successful as appearances would indicate.

Meantime, the industrial field at Montreal might well claim more studied attention from the hydro-electric interests. It is true that many industries are dependent upon their exhaust steam for heating purposes in winter time, thus, perhaps, making it more economical — at present prices at least — to operate by steam power during the winter months. Might it not be cheaper, though, to operate by hydro-electric power during the summer, when the heat of exhaust steam is not required? This may seem to present a difficulty to the power company which cannot undertake to sell power for six months only, and let the machines remain idle for the other six months of the year. But does not this difficulty suggest an idea wherein the results of technical effort may be more utilized. Why not use that power in winter for heating dwellings? Now the householder, if he had to pay for twelve months power when he can use it only for six months, could not afford to consider the idea, besides the present price of hydro-electric power precludes its application for heating purpose on an extensive scale, but, assuming a low price and that he has to pay only for what he uses, a comparison of cost shows that hydro-electric heating is not so far removed from the bounds of domestic economy.

Of the 26,000,000 British thermal units of heat contained in one ton of average coal, not over 50 per cent is available for radiation in the ordinary hot water heating system, and a further waste is caused by the lack of simple and efficient methods of regulating the temperature of rooms. Heating by electricity, on the other hand, facilitates control of radiation without any loss by merely pressing a button, and each room in a dwelling may be regulated separately if desired.

In one kilowatt hour(equal to one and a third horse power hour) of electrical energy, there are 3,420 British thermal units, of which about 3,000 B.T.U. are available for radiation. To produce the same heat radiation as one ton of coal, it requires, therefore, 4,330 kilowatt hours of electric power. On this basis, assuming for comparison that the average house consumes one ton of coal per month, it will require six kilowatts, or eight horse power of electric energy, to provide the same heating capacity. Six months heating with coal at $9.00 a ton would cost $54.00. The question now is, simply, can hydro-electric power be furnished for six months at $7.00 a horse power?

Perhaps not, under present conditions, but if the price of coal continues to rise, and authorities state that the days of Pennsylvania anthracite are numbered, it may not be long before electric heating becomes a reality in a community like Montreal, especially when the more varied uses of power will tend to lower the **load factor.**

R. O. SWEEZEY,

Royal Military College.
March 18th, 1915.

THE ERASING CAPACITY OF TUB-SIZED STOCK

By HARRY A. MADDOX.

(Special to Pulp and Paper Magazine)

The power to withstand erasure, often severe and repeated, is an essential qualification of the high grade writing or ledger papers. From our own experience it has often proved to be the crucial point in the buying process and on more than one occasion large orders have been lost to certain manufacturers because their product did not embody quite the right character for easy and efficient erasure. The question of price does not by any means control the condition of ink and erasure resistance. Some tub-sized papers offer so resistant a character that repeated erasure and re-writing may be performed with success on the same spot. Other tub-sized papers are so sensitive that the surface is injured at the first erasure and subsequent ink writing spreads. A second erasure on such a paper would probably create a hole and thus ruin the sheet. A series of trials on a number of demy (20'' x 15 1-2'') sheets of both resin and gelatine sized account-book paper showed that, on the average, resin sized paper would stand two erasures only before holing. The softness of resin sized papers makes erasure a very easy and rapid operation compared with the hard surface of tub-sized paper. The amount of fibre removed is naturally much greater, hence the roughness and disfiguration of the surface and consequent spreading of the ink.

Sheets of paper which embodied a combination of resin and gelatine size (as the majority of ordinary grade machine made account book papers now do) took on the average four erasures before holing. The surface was injured rather more than is the case with wholly tub-sized stock, but to nothing like the extent that engine-sized paper usually is. There is generally a slight tendency to spread after the second erasure, due no doubt to the check action of the resin and alum on the gelatine absorption during the sizing process. Lower grades of account book paper embodying both resin and gelatine size, proved to be no more efficient than wholly resin sized stock, inasmuch as that they holed within the same period, gave more trouble in erasure and presented an equally roughened surface with similar spreading of ink. Obviously, so far as strict economy and erasing quality is concerned there is a limit to the extent to which combinative sizing may be applied.

The class of stock which offers the greatest resistance to repeated erasure and pen and ink writing is wholly tub-sized, loft dried, rag paper which has been treated under scientifically controlled conditions in regard to nature of the size solution, extent of permeation and regulation of drying and finishing. The model of this type is the English handmade paper although certain grades of machine made stock approach it in excellence and are even superior in erasing capacity to several varieties of the handmade. Under test, these papers withstand from five erasures upwards with a surface almost unimpaired. In fact the very operation of frictional erasing on the hard and tough surface seemed to automatically produce a substitute finish. The easiness of the erasing varies however with the different papers, for while some lend themselves to the process others make it so difficult that much time is wasted before the undesired writing is totally removed. For a paper to be thoroughly efficient so far as erasing capacity is concerned it should allow speedy and easy progress to be made, with either ink erasing rubber or erasing knife. This is where many otherwise perfect papers fail and for this reason large paper-buyers are compelled to pass over certain grades of stock in favour of those which show finer erasing quality. The common objection to the extremely hardsized ledger papers (unsuitable for erasing upon) to which we have alluded is that they take ink writing so firmly, and possess so repellent a surface, that a prodigious amount of energy and time is required to remove the ink stain with either rubber or knife. In fact the knife is rarely able to remove the ink without absolutely cutting the surface. On the contrary, there are a few makes of the finest tub-sized and loft dried papers which allow erasures to be performed with the utmost rapidity and ease, the inky portion coming away under the rubber in quite a fine powdery form. Further, the surface remains practically unimpaired save for a slight dulling.

The capacitiy of a writing paper for erasing, no doubt depends very largely upon the extent to which the gelatine solution penetrates the sheet during the sizing process. Equally important, of course, is the consequent retention of the gelatine in a fixed and settled condition. These factors play a large part in determining the ultimate penetrative power of the writing ink, in other words, the depth to which erasure must needs be carried in order to remove the last and deepest traces of the stains. The character of the sizing and the fibres themselves in this deepest portion of the sheet (to which the erasing has had to be driven) determine whether re-writing may be carried out and incidentally prove the efficiency or otherwise of the sizing process. If the sizing weakens in the interior of the sheet, the violent abrasive or cutting of the fibres creates an opportunity for the ink to flow or flood, hence the stock proves unsuited to its use. We may expect this type of action more from papers which have been inefficiently doped with resin size and then carelessly operated on with low grade gelatine than from either wholly resin-sized or tub-sized stock. At the same time there are some ways in which wholly tub-sized stock may be so turned out as to embody defects of the type under notice.

Until recent years the principle of resin-sizing the stuff which was ultimately to be tub-sized was not generally recognized. Now, however, almost all, save the most expensive grades (and even some of these) embody a preliminary doping of resinate, the idea no doubt being held that some degree of economy is attained. In the case of cheaper papers it is claimed that a better and stronger sheet may be obtained under this method. From the point of view of erasure efficiency, however, we may argue that the resin size, which itself is added in insufficient proportion to procure a thorough sizing, checks or arrests the action of the gelatine. This is more particularly the case if alum is present in excess. The resinate itself prevents an absolute permeation of the sheet and to a large extent repels the gelatine, which is then only allowed to settle as a surface film. The result upon the finished paper is that the sparse coating of gelatine is speedily removed by the first erasure and the inefficiently resinsized portion is revealed. Subsequent writing upon this area causes the ink to spread and further erasure to entirely destroy the paper.

If the paper is thoroughly permeated by the gelatine (a condition which can only be brought about if the stuff is practically free from resin or alum) repeated erasures encounter precisely the same constitution and leave the area almost as efficiently sized as at the onset. The hardness and tenacity imparted by the solution oppose and control the destructive tendencies of the erasing material, thus ensuring a practically undamaged area under any ordinary conditions of erasure. Undoubtedly the degree of hardness and tenacity to which the paper is tempered has a considerable effect upon the convenience with which erasing may be performed. The aim of the sizing vatman should be to produce a kindly or mellow feel in the sheets, as opposed to the tinny brittleness which is so characteristic of many high grade papers. Excess gelatine on the surfaces is one of the causes of super-hardness. The gelatine is required more in the sheet than on it. In a previous issue we discussed the influence of heat in drying surplus moisture in the water leaf, and excess alum in the stuff; pointing out how the sizing effect was obtained mainly on the surface. Alum, it is understood, hardens the paper (apart from its effect upon gelatine) and thus to a large extent prevents efficient permeation by the tubsizing solution settling the latter mainly on the surface. The hardness imparted makes erasure a difficult and tedious process.

Fine white soap, free from curdling propensities, is a useful agent in the vat, provided that it is added in due order to avoid precipitation. It imparts much of the kindly nature before alluded to, and eases the ultimate guillotine operations. For obvious reasons the proportions admitted require to be carefully controlled and the color should be such as to improve, rather than degrade, the gelatine. A chief objection to soap, however, is its liability to create frothing troubles. These may be surmounted by the selection of a reliable and special make for the purpose in hand, helped if necessary by the application of the usual antidotes.

The most successful grades of tub-sized paper, so far as erasing capacity is concerned, are those which have been slowly and naturally loft-dried. By this method the gelatine is allowed ideal conditions for maturing and settling in a permanent manner. Artificial drying, particularly when performed at too decided a temperature, withdraws the gelatine from the body of the stock to an appreciable extent and settles it on or near the surface. Loft drying at low temperature, on the other hand, decides the settled permeation of the sheets by the gelatine and thus permits the maximum degree of strength and elasticity (combined with absolute efficiency against ultimate repeated erasures), to be obtained.

Casein from India

The chief difficulty attending the production of milk in large quantities in India is that of distribution. There are many places where cows may be kept and multiplied in great numbers, but as their milk cannot be consumed on the spot, difficulties attending transport immediately present themselves, and these are aggravated by the dirty habits of the cow-keepers that every effort of supervision even in large cities has failed to correct. There are no refrigerator cars in India, and none of the provisions for the transport of milk that are found in many other countries where it is carried long distances to supply the large cities. Butter may be separated, packed and transported to any distance, but the remaining milk, unless it can be used quickly and near the place of production, is liable to be a drug.

By converting it into casein, a dry, nondecaying substance that may be packed in boxes or bags, it may be carried by any means to any distance, and find a ready sale for use as a substitute for celluloid, over which it has the great advantage of not being inflammable. For some years a profitable business has been carried on at Anand in the Baroda State in the production of casein for export. The process resembles the manufacture of cheese. The skimmed milk is coagulated by rennet, precipitated by hydrochloric acid, and separated in a centrifugal filter. The result is a whitish or yellowish mass which, after drying, is the casein of commerce. There are several ways of separating it, one of the most recent being by a current of electricity, that is said to be the cheapest where current from water or wind power is available.

Casein has also been extracted in a large scale from the soya bean after first removing the oil by pressing. One of the most important uses of casein is the production of galalith, which is used to imitate ivory, tortoise shell and celluloid. It is cheaper than celluloid, Galallith is made from casein by pressure, which forms it into cakes that are then compressed together to the desired thickness. It is translucent, and can be given any colour. It has no bad odour, and will take a high polish. When heated to 150 deg. C. in a bath of oil, it can be moulded by pressure. It is already used for a great variety of low-priced articles, including waterproofs, that do not soften and stick together like rubber goods in a tropical climate. It is made into plates, rods and tubs, like ebonite. Galalith factories are in creasing in number in Europe. In 1910 at Lurgère (France) 440,000 pounds of casein were converted into galalith — the produce of 35 dairies that sent their milk to the factory. It takes 15.85 gallons of milk to produce 2.20 lbs. of galalith.

Milk casein is also used for sizing paper which is waterproof and resembles parchment. Silks, artificial textiles, leather, films and plastic substances are prepared with the aid of casein, and in printing calico a solution of vegetable casein and borax is sometimes used as a thickening agent which adds brilliancy to the colour and gives a silky appearance.—Indian Textile Journal.

The Chemist in the Pulp and Paper Industry

By FRANK L. MOORE

President of the American Paper and Pulp Association.

Paper read before the New Orleans meeting of the American Chemical Society.

The manufacture of pulp and paper is an industry based largely on chemical reactions and processes and as such has been largely dependent upon the efforts of chemists for its maintenance and advancement. Chemists of former days are responsible for inventions to which papermaking literally owes its existence in its present form, and our modern chemists are essential factors in the everyday operation of this industry. It is not too much to say that the development of modern papermaking and the enormous extensions of the use of paper in recent times have been due for the most part to the introduction of the three chemical processes by which wood fibre has been made available as a general substitute for rags.

The sulphite process, by which wood is reduced to paper pulp by digestion in acid bisulphite solutions, was invented by a Philadelphia chemist, B. C. Tilghman, in 1867. Tilghman was also the inventor of the sandblast and of the important autoclave process for the manufacture of glycerin. Although his attempts to manufacture sulphite fibre upon a commercial scale failed and were abandoned because of the many serious technical difficulties encountered, his patents nevertheless disclosed a remarkably clear and comprehensive understanding of the principles involved. The process was later taken up in Sweden by Ekman and in Germany by Mitscherlich, both of whom were chemists, and by other inventors in England and elsewhere, by whom it was developed along somewhat divergent lines. It returned to the United States in 1883 when the mill of the Richmond Paper Company was built at Rumford, R. I., to operate under the Ekman modification of the process, with a nominal capacity of 10 tons a day. Arthur D. Little, who served for many years as official chemist of the American Paper and Pulp Association, began his professional work as chemist to this plant. From this modest beginning, the sulphite industry of the United States has developed at present to a daily production upwards of 5,000 tons, and the process has revolutionized many departments of paper manufacture. Needless to say its efficient operation requires constant chemical supervision and control.

Another important chemical wood process, the soda process, by which the wood is reduced to pulp by digestion in a strong solution of caustic soda, became possible only after the discoveries and engineering triumphs of a long series of chemists, from Leblanc down through Muspratt, Weldon, and Tennant had supplied the world with cheap caustic and carbonated alkali.

The soda process itself as applied to the manufacture of woodpulp is, like the sulphite process, of American origin, having been invented by Watt and Burgess, in 1853 and developed at Manayunk, near Philadelphia. At first and for many years the process was operated with no attempt at recovery of the soda liquors. The process has been able to hold its own only because of the development, largely by chemists, of the processes of soda recovery. Similarly, in the case of the sulphite process, many chemists have attacked the far more difficult problem of utilizing the waste sulphite liquors, but thus far only with moderate success. It is, nevertheless, to chemists that we must look for the solution of this important problem.

The sulphate process for chemical woodpulp, an interesting modification of the soda process, was developed by the chemist Dahl at Danzig about 1883. It has become of great industrial importance during the last few years through its application to the manufacture of the now well known kraft wrapping paper, the introduction of which from Sweden has already exercised a profound influence upon the whole wrapping paper industry.

The great names of Leblanc, Weldon, Solvay, and Mond stand for the highest type of the chemical engineer, and to them and the long line of their associates and successors the paper trade, like many other industries, is indebted for the cheap alkali and cheap bleaching powder, without which it could hardly exist today. It is only necessary to contrast the old methods of treating rags by retting and grass bleaching with the modern methods of pressure cooking and rapid bleaching to realize how many of the foundation stones of papermaking have been set in place by chemists.

A further step in advance is the production of electrolytic bleach and alkali which has become a matter of routine in many paper mills as the result of the discoveries of Watt in 1851, and the later work of chemists like Le Sueur, Hargraves, Castner, Townsend, and many others.

Among the less fundamental, but nevertheless highly important advances in the art of papermaking, which are directly attributed to the chemist, is the introduction of coal-tar colors. Practically all of the colors now employed in papermaking are the products of the chemical laboratory, the work of an army of German chemists having supplied us with the whole wonderful range of coal-tar colors, many of which are more permanent than the natural dyestuffs which they displace.

To chemists also we are indebted for the discovery of the useful properties of rosin in rendering paper resistant to ink and water and for the modern methods of rosin size production, for processes for producing casein for paper coating and for rendering it insoluble by the action of formaldehyde, for the discovery of soluble starch so largely used for top sizing, for processes of water purification, and those for the manufacture of alum, especially of the high grade alum the cheap production of which has been made possible by the Bayer process for the manufacture of pure alumina.

Enough has been said to indicate the vastly important service which the chemist has rendered in the development of the pulp and paper industry. The chemist of today has become vital to the industry's operation and advancement. Under the stress of modern competition, pulp and paper manufacturers are forced to turn to the chemist with constantly increasing frequency for the testing of supplies, for the control of processes, many of which are essentially chemical in nature, and for the elimination of wastes. The testing of paper, which yearly assumes increasing importance, is entirely in the hands of the chemist, and the chemist is in large part responsible for the startling expansion in the use of paper which has taken place in the last two decades.

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Scientific Management in the Paper Mill

By W. F. ROCKWELL, of Clinton H. Scovel & Co., Boston, Mass.

The principles of scientific management have been successfully applied in a number of representative American paper mills. It is the purpose of this paper to point out a few of the features that have proved most profitable. Planning, based on accurate knowledge of the requirements of the product and records of the capacities and performances of the various units in the paper mill, has enabled these mills to increase profits, to improve the quality of their products, and to improve working conditions.

In papermaking the product goes from raw material to finished paper through a series of operations which must follow a certain sequence, and which in some cases require a certain length of time to obtain the best results, and in other cases must not be processed longer than a certain time in order to obtain good results. To illustrate the point, take the operation of washing rag stock after it comes from the bleach boilers. To wash thoroughly the rags and prepare the fibre it is necessary to continue the operation for a certain number of hours, depending upon the kind of material. Through lack of planning it may be necessary to shorten this washing time, and this is often done by increasing the amount of bleach. When this is done, however, it increases the cost of bleach. The chemicals may be made so strong that they react on the fibres and the finished paper is absolutely certain to show the effect of this haste by an inferior apearance, rapid deterioration, and an increased cost. It is not economical to wash the stock for a greater length of time than is necessary, as this would result in a large increase in power consumption, an increasing loss of fibre in the wash water, and other unnecessary expenses.

Another process which requires a certain length of time in order to get the best results is draining. It is probable that this process is more abused than any other in the paper mill by reason of poor planning. Certain kinds of halfstuffs should be drained at least eight days. It is an extremely simple matter to make up for some error in planning by taking out the halfstuff before this period of time has elapsed. If this is done, the bleach and chlorine will not have worked out thoroughly from the halfstuff. Trouble may not be experienced until after the paper is sold. In the case of certain writing papers, for example, it has been the writer's experience that some papers testing as high as 25 on the Mullen tester have dropped down to 12 within six months of the time they came from the paper machine. Examination proved conclusively that this loss of strength was due to bleach in the paper, which would have been worked out if the halfstuff had been left in the drainers a sufficient length of time.

It should be the duty of the planning department to schedule the work for each unit, in order to give the product the proper time in each process, the time being increased when it is likely to have beneficial results, making certain, however, that the time is never decreased when the results will be detrimental to the finished product.

While diversity of the product increases the difficulty of planning the work, it also increases the opportunities for the planning department to make improvements and increase profits. In paper mills which include sulphite, sulphate, soda, and mechanical pulp, and a few of the many grades of rags and paper stock, it is necessary to put the control of materials under the planning department in order to have the proper materials on hand when required and to prevent accumulating larger quantities than necessary, as this would increase the expense of storing and absorb too large an amount of the working capital.

One of the first steps in planning is to determine the probable output of each kind and grade of paper. In some paper mills it is the custom to set limits on the stock of finished paper and make up run orders to keep within the limits. In other paper mills, run orders are based to a large extent on actual sales orders. In this case it is possible, by keeping in touch with the salesmen and by obtaining statistics on actual sales, to estimate very closely the probable demand for each kind of paper. When such an estimate has been made, it is a simple matter to determine from the furnishes the probable consumption of each kind of raw material and to establish minimum stock limits. The maximum stock limits will depend on the consumption, the price concessions that can be obtained by increasing the size of the order, the cost of storing the stock, including interest on investment, etc. It is the custom in many mills to contract for as much as a year's supply of some stocks, the deliveries and payments being made according to contract.

Where wood pulp and rag stock are used in varying proportions in the products of a paper mill, it is quite customary to find that the run on the machine is changed occasionally from a product requiring a large amount of rag stock to one requiring a large amount of woodpulp without any notification to the rag department. The result is that the drainers are gradually filled up with stock which cannot be removed quickly enough to make room for that coming through from the preceding processes. This crowded condition becomes apparent and the washers are run longer than necessary. The time in the bleach boilers is increased, and, when the situation becomes apparent in the rag department, the workmen slow up in their work so that the cost of sorting increases very rapidly. It may become necessary to shut down the rag department, when there is sure to be a loss, either through losing employees whom it has cost money to educate in the particular methods of the plant, or to hold employees and put them on other work in which they are not efficient, until the rag room starts to run again. By reducing the frequency of these and similar occurrences, planning proves a benefit to the employee.

In order to plan the work it is necessary to know the capacity of each unit and the standard time for each operation on each kind of stock. It is possible to determine quite accurately the time necessary to thrash each grade of rag in the mill. Some grades of rags that are used may require sorting, while other grades can be passed immediately to the inspectors, as they are supposed to have been sorted before baling. A standard time can be determined for sorting each grade and kind of rag or paper stock. It is true that different lots from the same or different dealers will differ considerably, but, if the standard is properly set, these differences will not affect the average time, and the variation from the standard time will point out inefficiency in handling, or change in quality of purchases. A standard time and a standard quantity of the various bleaching materials should be determined for cooking and bleaching each grade of rags and paper stock.

When the standard times for the various operations for each kind of rag and paper stock are determined, it is seen at once that notice must be given the sorting room a number of days before any run can be made on the paper machine. It is surprising to find that a number of paper mills do not plan the work for the sorting room from ten days' to two weeks' time in advance of the planned paper mill runs. They take advantage of a large storage capacity to have the department run on whatever time their judgment may determine as correct. Where these conditions prevail, it is frequently the case that a desired run on the paper machine cannot be made because of some misjudgment on the part of the foreman who has charge of the work preceding the washing and bleaching of the halfstuff.

The operation of the paper machine itself can be simplified and the expense decreased by a careful planning of the sequence or funs. Every papermaker knows that it is easier to run certain papers in succession than to change from a grade representing one extreme made on that machine to a grade representing the other extrtme. To change from one weight of paper to another weight is a trifling job and can be done with a minimum amount of broke and loss of time. In running colored papers on the same machine, it is possible, by planning a sequence of colors, to decrease the time for washup, and the amount of broke, which always results from the retention in pipes or other confined spaces of small colored particles from a previous run of paper.

In some mills the same machine produces machine-dried and loft-dried papers. Without a planning department, which schedules work to all departments, it is certain that these changes will be made without adequate notice to the loft-drying department, and as a result a considerable number of men must be laid off or put on other work when changing to machine-dried, while a quick change to loft drying will result in shutting down the roll calenders.

To keep the manager or superintendent in constant touch with actual conditions, it is possible to install a planning board or dispatch board in his office, on which is shown, in logical order, each unit from thrashers to lay-boys, and against each unit may be shown the run order or the product which is being processed. Provision also may be made to show the next work planned. It is easy to see the value of such a device to the executives of a paper mill. A bird's-eye view is given of the entire plant's operation. Errors of omission or commission are often foreseen and corrected before harm is done.—"Paper."

SACKS FROM PAPER YARN.

According to the "Papier-Zeitung," the yarn from which paper sacks are made consist of strips of natural brown cell-stoff paper, firmly and uniformly twisted. It does not materially lose its strength as long as it remains twisted, the same feature remaining after it is made into sacks.

According to the contemplated burden and the material to be conveyed, the nature of the weaving differs. In some cases a lining of thin soft crepe renders the sack entirely dustproof, without diminishing its suppleness.

German papers have been urging the special advantages of paper a domestic product instead of an imported one.

Stamps for War Tax

The Post Office Department, having given notice a week or two ago, in connection with the War Revenue Act, that all letters and postcards mailed in Canada for delivery in Canada, the United States or Mexico, and letters mailed in Canada for delivery in the United Kingdom and British possessions generally, or wherever the two-cent rate applied, should in addition to ordinary postage carry a one-cent stamp as a war tax, and also having notified the public that such war tax, while it should be paid preferably by the postage stamp marked "War Tax," could, if such stamp were not available, be paid by an ordinary one cent postage stamp, is now issuing further notice to the effect that postage stamps may be used for the prepayment of war duties on bank cheques, bills of exchange, promissory notes, express money orders, proprietary or patent medicines, perfumery, wines or champagne, as well as upon letters and postcards, postal notes and post office money orders, the intention being to provide facilities in those portions of the country where excise stamps are not readily available. This in view of the fact that postage stamps may be obtained at all points over the whole country, in many places where there is no Collector of Inland Revenue and no Inland Revenue stamps could be obtained, is a distinct convenience to the public, and no doubt will be largely taken advantage of.

Opening for Wood Pulp in Spain

The Department of Trade and Commerce has received a communication from Bilbao, Spain, which states that present conditions are favorable for the introduction of Canadian wood pulp on the Spanish market. It is written by the managing director of a company having excellent business connections with the large paper manufacturers of the Peninsula and who desires to obtain the representation for the Spanish Peninsula of a large producer or a group of Canadian producers of wood pulp. Owing to the difficulties occasioned by the war, in the importation of wood pulp of Scandinavian origin, as practised in former years, the question of raw material has become an important consideration to the Spanish paper manufacturers.

The following figures of the imports of pulp into Spain in recent years will give some idea as to the importance of the market:—

	1911. Tons.	1912. Tons.	1913. Tons.
Norway	5,900	6,200	6,370
Baltic Russia	2,000	1,800	1,380
Sweden	16,330	18,025	34,257

The figures for 1914 have not yet been published.

The writer in question also points out that important lots of cudgels could be placed for the manufacturing of pulp by the consumers.

If the Canadian producers of wood pulp can quote prices to compete with the Scandinavian, Spain should present a good opening for their product. Those interested should communicate with the Department of Trade and Commerce, Ottawa, for the name and address of the writer of the communication referred to, as he is desirous of being brought into touch with one or several large Canadian producers of wood pulp. (Refer File No. A 1107.)

The Computation of Boiler-Tank Volumes

The Rapid Calculation of Liquor Volumes in Horizontal Cylindrical Tanks.

By F. E. DICKINSON.

The rapid calculation of the volume of liquid contained in a partially full horizontal cylindrical tank, or store boiler, would, I venture to think, be a boon to almost every works manager in the chemical industry. But few works have not one, at least, converted Lancashire or locomotive boiler used as a store tank for various liquids, and the calculations usually involved when the weight of this liquid is required for stocktaking or other purposes are wearisome in the extreme. Anyone who has the task of checking, say, a dozen of these tanks at fairly short intervals will be aware of the enormous amount of labor expended and time wasted by the ordinary mensuration methods.

The graph given herewith has been used for some time past in a well-known chemical works in the north of England, and has been found of great service in saving time and trouble, while its accuracy is as great as can be obtained by any method, since, in practice, it is impossible to dip a tank within ¼ in. of its true depth. On account, therefore, of its proved value, I consider it deserves to be more widely known in order that its benefits may be shared by all works managers, a much harrassed body of men who will appreciate any device which will lighten their burden.

No practical purpose will be served by entering into the mathematical process by which the graph is derived since it is its application which is of interest.

A convenient working size, and one which permits of a more than sufficient degree of accuracy, is obtained by enlarging the accompanying graph upon a sheet about 20 x 24 inches ruled in millimetre squares.

Having once obtained the graph, the necessary calculations are simple in the extreme. The total capacity (C) of the tank is first ascertained from the simple formula:—

$$= \Pi \left(\tfrac{d}{2}\right)^2 l \text{ cu. in.}$$

$$= \frac{\Pi \left(\tfrac{d}{2}\right)^2 l}{278} \text{ gallons.}$$

$$= \frac{\Pi \left(\tfrac{d}{2}\right)^2 l}{27.8} \times \text{spec. gravity lb.}$$

and this remains a constant for each tank.

The next thing to be found is the ratio:—

$$\frac{\text{Height of liquid in tank (found by dipping)}}{\text{Internal diameter of tank}}$$

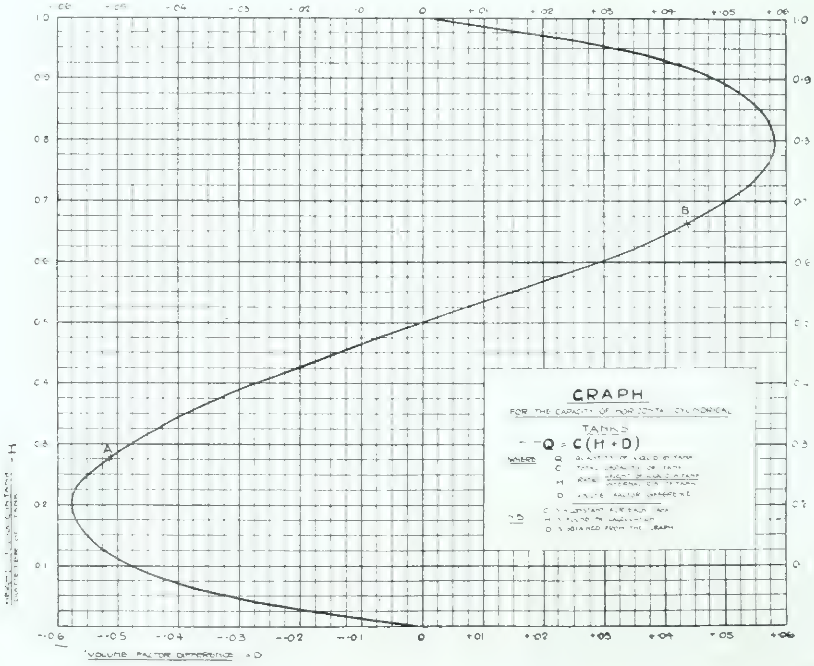
and this ratio we will call H.

We next consult the graph, and from the value of H (vertical abscissa) we obtain a value for D (horizontal abscissa).

We now have all the necessary factors, and the quantity of liquid in the tank (Q) which we require is found from the equation:—

$$Q = C(H + D).$$

It is important to note that when the tank is less



than half-full, D is a minus quantity, while it becomes plus when the tank is more than half-full.

An example will perhaps demonstrate the value of this device more easily than explanation. Let us suppose we have a tank of total capacity of 1,000 gallons, that its internal diameter is 3 ft., and that we have 10 in. of liquid in it. Then—

$$\begin{aligned} Q &= C(H + D). \\ &= 1000\left(\frac{10}{36} + D\right) \\ &= 1000\ (0.277-0.051)\ \text{(see pt. A on graph)} \\ &= 226\ \text{gallons.} \end{aligned}$$

Again, let us suppose the tank to contain 24 in. of liquid, then—

$$\begin{aligned} Q &= C(H + D) \\ &= 1000\left(\frac{24}{36} + D\right)\ \text{gallons} \\ &= 1000\ (0.666+0.044)\ \text{gallons (see pt. B on graph)} \\ &= 710\ \text{gallons.} \end{aligned}$$

According as C is expressed in cubic inches, gallons, or pounds, so the result Q will be given in the same units.

It should be noted that the computation of volumes of egg-ended boilers is outside the scope of this graph, and in this case it would be necessary to correct for the volume contained in the dished ends.—Chemical Trade Journal.

An American View

Under the caption "An Illogical Demand," Paper Trade Journal, New York, says of the Canadian freight rates situation:—

A proposed increase in cost of freight is one of sundry annoyances with which Canadian manufacturers of pulp and paper have to deal at a most inopportune time. The railroads following the successful example set by the American confreres are clamoring for advanced rates and opposed to them are the Canadian Pulp and Paper Association and the Canadian Lumbermen's Association.

Already there has been an advance of five per cent on export charges and the proposal of the roads is now to increase the domestic rates, and as Canada is a country of magnificent distances the matter of additional cost of transportation is all the more serious and is especially threatening in view of general conditions in the paper industry at the present time. The excuse of the railroads in their proposal for an advance is based on alleged increased operating expenses, and a falling off in the volume of business. They set forth the claim in the first place that they differ from manufacturing and industrial corporations in that they are not permitted of themselves to regulate the cost of transportation which is the only product they have to sell, and they appeal for permission so to do on the grounds that they support so large a proportion of the population of Canada directly and indirectly that a "reasonable" profit on their capital is essential to the welfare of the nation.

This sounds almost patriotic but an impartial analysis of the situation from the standpoints of "national welfare" and general economic principles will not justify the claim.

There is not a manufacturer in the Dominion who would not be rejoiced to see the railroads earning big dividends and adding extensively to capital account. When the railroads are prosperous it signifies that the industries which support them are correspondingly well off. But you cannot thrust prosperity on the roads at the expense of those who supply the business, at a time when the latter happen to be in turn hard pressed to provide "reasonable" profits for their shareholders. The railroads in this instance have chosen an inopportune moment to press their demands, and if the commissioners gauge the situation correctly, not only will the request not be granted, but the refusal will operate for the "welfare of the nation," not omitting that section of the community devoted to transportation. To grant an increase in rates to Canadian roads at this moment would be just as sound and economic a policy as it is to pay dividends out of capital. You should not exact from a customer a price which he cannot afford to pay and expect him to make money. Remember that on his earning capacity depends his ability to do business with you. To restrict this capacity is to limit your own business.

One reason advanced by the roads for asking an increase is that business with them has fallen off. Do they expect to improve the volume of trade by adding further burdens to it?

The present is a time when enterprise and business should be encouraged and a general spirit of forbearance is most essential. If the Canadian mills were running at capacity and getting good prices for their product the roads might be justified in asking for a proportionate share of the profitable trade. But that same decreased business of which they complain affords ample evidence that the mills and the lumbermen are not in a position to stand the added cost to their production which the demand would entail and the enforcement of it would tend to still further curtail the business offered to the roads. If therefore the logic of the argument advanced by the carriers were to apply, then the smaller the business of the producer the higher the rates should be marked. But if unable to bear the added burden, business dwindled away to nothing and the mills were forced to close, of what avail would higher rates be? It is unfortunate if there be not enough profit in the paper and lumbering industries to go round at this particular time so that the roads might get a so-called reasonable share, but it is folly to attempt the impossible or to kill the goose which lays the golden egg.

There will come a time, and it may not be very long delayed, when business will justify a higher freight charge. When this time arrives let the roads present a reasonable argument for a proportionate share of the prosperity, and we do not doubt that the manufacturers will meet them in a spirit of reason and fair play. But to harass the shippers now is nothing short of arrant folly and displays an ignorance of fundamental business principles for which there is no excuse.

OBITUARY.

Many old friends in the paper trade will regret to learn of the death of James Reid, of Reid and Co., dealers in paper, etc., Quebec, Que. He had attained the ripe age of eighty-three years and leaves a widow, three sons and three daughters. With his brother, the late William Reid, the deceased at one time conducted a large paper mill at Lorette, with a branch office in Montreal. After the death of the brother he continued the business until the mill was destroyed by fire. He then confined his operations to the handling of paper and paper mill supplies.

Technique of Soda Lye Manufacture

The manufacture of caustic soda solution for paper mill purposes is a simple operation, proceeding on definite lines, and requiring only that properly regulated quantities of the necessary re-agents should be agitated together in water for a sufficient length of time at an elevated temperature. There are certain governing factors, however, which demand consideration in conducting the operation on a large scale, the neglect of which may mean irregular results, i.e., liquors causticized to varying degrees, differing concentrations, waste of lime in "lime mud," etc., differences which make themselves apparent in the stock with which the liquor is subsequently boiled.

The first consideration is, of course, the accurate adjustment of the quantities of lime and carbonate of soda needed. The latter, obtained as "58 per cent soda ash," whether prepared by the Leblanc or ammonia process, contains so little impurity that its weight may be reckoned all carbonate of soda. Where, however, it is in the form of a solution previously prepared by exhausting with water in lixiviating tanks the ash from the soda recovery plant, measurement is best made by the hydrometer, care being taken that the solution is always at a constant temperature, or that the proper correction is made for any variation in this respect. It is then a simple matter, by reference to a prepared table, to obtain the content of the carbonate of soda in solution in pounds per gallon.

It is more difficult to get the correct weight of lime necessary. There is always, even in the best limes, a certain proportion of inactive stone, which it is difficult to detect till after the operation is finished, when it is left in the "cage." This difficulty alone, however, is not difficult to overcome, since impurities of this kind form a fairly regular percentage through a series of deliveries, and can, therefore, be allowed for. The chief difficulty with lime is its tendency to absorb atmospheric moisture and carbon dioxide, and it does this in differing degrees, depending on length of time on rail or in storage, state of the atmosphere, etc. It is not uncommon for a truckload of lime to increase its weight 10 to 15 per cent during transit, and any length of time in storage sheds will suffice to allow a good proportion of it to absorb the 30 per cent of water needed to slake it entirely. It is obvious, then, that a given weight of lime may be misleading if relied on to indicate a definite amount of active calcium oxide.

In these circumstances it is necessary to periodically test the stock. The time necessary to carry out a complete analysis of lime for the water and carbonic acid it contains, as well as magnesia, alumina, silica, etc., renders it undesirable to adopt this method with any frequency. A good method, and meeting all the practical requirements of the case, is to keep a stock of pure carbonate of soda, and, at any time a test of the lime is to be made, to boil together equivalent quantities of the two until the reaction is complete. The strength of the lime is then shown by the degree to which it is able to convert the carbonate to hydrate, which may be estimated by titrating the causticized liquor before and after treatment with barium chloride. If a sufficient number of tests are made in this way with limes of varying strengths, a table can be formulated by reference to which the correct weight of lime needed to causticize a given amount of soda may be at once known, whatever its strength has been found to be. The testing of the liquor from time to time with dilute sulphuric or hydrochloric acid while the boiling is in progress is a useful guide, but while it may, if carried out with care, prove that insufficient lime has been used, it gives no indication that at any time an excess has been added.

Another important consideration is the density of the soda solution to be causticized. The decomposition taking place during the operation is expressed by the formula $Na_2\,CO_3 + Ca\,(HO)_2 = 2\,Na\,HO + Ca\,CO_3$, a reaction which is reversible, more particularly when the solutions are in the higher stages of concentration. When dealing with pure carbonate of soda solutions it is possible to obtain a very high degree of causticity if the percentage of soda is sufficiently small, the efficiency decreasing with increased concentration. The soda available in the majority of paper mills, however, is not pure, being chiefly the residue from the calcination of spent esparto liquors, etc., and containing in appreciable proportion sodium chloride, silicate, sulphate, etc., which modify somewhat the better results obtained when the pure carbonate only is used. Although the best results are obtained with dilute solutions, it is impracticable in actual working, of course, to employ weak liquors, and it becomes necessary to fix a point at which it is possible to obtain a good working causticity, at the same time keeping a sufficient density of solution. Experiments carried out on an industrial scale show that 93 per cent of the carbonate can be converted to hydrate, when there is 1 lb. per gallon of the commercial carbonate. This is a convenient working strength, and a sufficient causticity for practical purposes.

There are differences of opinion as to the length of time necessary to complete the causticizing. Cross and Bevan give the length of time necessary as two to three hours, while a contributor to a trade journal some time ago suggested bringing the solution to be causticized to 160 deg. F. and, while agitating, adding the lime, the slaking of which would bring the solution to the boil. No further heating was considered necessary, and after agitation for an hour the liquor was considered finished. These are the two extremes between which, by a series of experiments, the best conditions, in the writer's opinion, for the production of a satisfactory boiling liquor were found to be. Three trials were made, the solution containing the amount of soda recommended above. The solution was brought to 180 deg. F. before the lime was put in, and the addition of the latter caused the liquor to boil fairly violently, and sufficient steam (a small amount only is necessary) was kept in to keep the solution to the boil for the rest of the time. It was found an advantage to let the solution boil fairly rapidly during the addition of the lime, as this insured the proper removal of the latter from the "cage," a difficulty experienced when a trial was made with the solution at 160 deg. F. only. Fresh lime was used in each of the trials. A sample of the liquor was taken immediately after the completion of the addition of the lime, and at ten-minute intervals afterwards. The samples were tested for the degree of causticity, and the results set out in the following table, which is the average of the three trials:—

	Causticity Per Cent.
Immediately after the addition of lime.	73 .
Ten-minute intervals	84
" "	88.7
" "	90.4
" "	92.6
" "	93
" "	93.3

These trials make it clear that the action proceeds at a rapid rate from the commencement of the addition of lime, the conversion of 73 per cent being obtained during this time, which covered about twenty minutes. They also show that, providing the liquor is properly agitated and kept to boiling point, one hour from the time the lime is in is sufficient to bring the causticity to practically its highest figure.—Paper Trade Journal.

A LABORATORY FOR WOOD CELLULOSE RESEARCH

By PROF. DR. CARL G. SCHWALBE

In Papier Zeitung. Illustrations courtesy of "Paper."

A year ago I was able to report to you the foundation of an Experimental Station for Wood and Cellulose Chemistry at Eberswalde. Today I can inform you that this cellulose laboratory is in operation. I may state that its establishment is due to a certain extent to a collection which Mill Director Sureth was good enough to undertake some years ago. Among a circle of cellulose manufacturers he got together the sum of 3,100 marks and this became the nucleus of the very considerable amount since expended for apparatus. I have been fortunate enough to enjoy, on the part of my superior officers and the Department of Agriculture Domains and Forests, the most liberal support and the most perfect concert of action, the best evidence of which is that in the course of a year, not less than 17,000 marks has been placed at my disposal for the purchase of apparatus.

The new institution was installed in an already existant setting, i.e., it was incorporated with the forestry experimental establishment of Prussia. To the Chief Station of Forestry Research Affairs at Eberswalde has been added a new, a seventh, a chemotechnological division. In completing the apparatus for this new division, in recognition of the importance of the cellulose industry, it was accorded first consideration. The new experimental station was able to begin operations under the most favorable auspices, inasmuch as the Association of German Cellulose Manufacturers (Varein Deutsche Zellstoffabriken) granted it a very generous subvention for the year 1914-15, so that the work can be carried out on a comparatively large scale.

As regards the problems submitted to such special laboratory, they are of dual character. On the one hand new processes are to be tested, on the other, by scientific research work, the chemistry of wood and cellulose is to be advanced wherever possible. More especially the manufacturing processes as practised at the present time should be subjected to a thorough scientific working over, so that not only the "how" but the "why" of these processes may be made known and a more certain working and an improvement to the product may be effected.

It is very evident that such work can be accomplished better in a special laboratory than in a business establishment, since experiments in practice, considering the great capacity of the digesters common in the cellulose industry, would entail heavy expense. It may also be readily understood that a certain disturbance in the ordinary course of working is inseparable from experimentation, and, finally, the managers of a business have not the leisure, outside of their regular routine duties, to devote themselves completely to such research work.

All these reasons furnish grounds for the prosecution of such investigations in an experimental station, where these objectionable features are non-existent and where, at very much smaller expense, a far larger number of experiments on a given subject may be conducted.

In preliminary experiments, the limits of the reaction to be studied are first determined for which purpose experiments on a small scale usually suffice. If, for example, I desire to determine whether, on heating wood in sulphite lye of ordinary concentration at 140 deg., a carbonization takes place, I can decide this just as well in an experiment with 1 to 2 kilogrammes of wood, so that it is unnecessary to convert the contents of a mill digester into a useless substance. On the other hand, however, such an experimental station

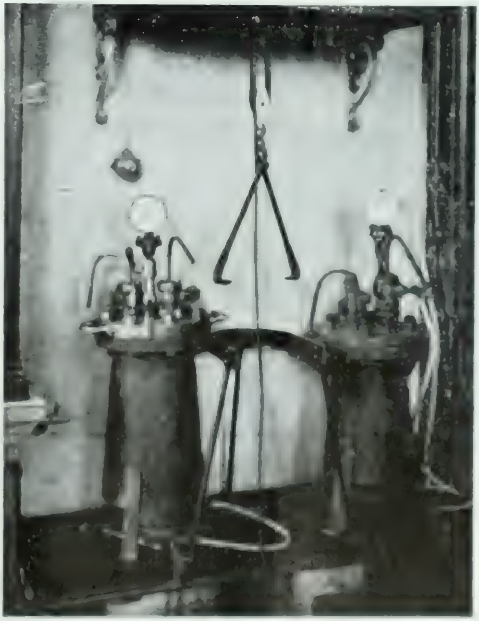


Fig. 1

must be capable of furnishing enough of any cellulose product to permit of experiments with it in paper mill practice, in order to enable the practical man to get an idea regarding the working properties of possible new kinds of cellulose.

The apparatus of this new experimental station has been planned with this object in view. The smaller apparatus serve to determine the limit of the reaction, the larger to produce a sufficient quantity of material for practical purposes.

I now propose, with the aid of photographs, to show the apparatus for small preliminary tests as well as for larger experiments.

Fig. 1 shows two autoclaves, which may be purchased in the market of this size, but not of this form. The ordinary bolt fastening, which, with the constant use of apparatus of this kind, soon becomes leaky, must be avoided. I have therefore had the apparatus newly constructed and it answers the required purpose very well. (Here the lecturer explained the form of construction.) The admission during the operation of steam, gas, and also fluids and on the contrary the withdrawals of steam, gas and fluids during the experiments, have been provided for, so that samples of every description can be taken. It was considered that in some instances it might be desirable to work at quite a high pressure, the vessels shown will withstand a pressure of twenty-five atmospheres, and more. One of the cooking receptacles, the sulphite digester, has a porcelain lining that can be removed, so that the sometimes determined troublesome effect on the material in the digester can be wholly overcome.

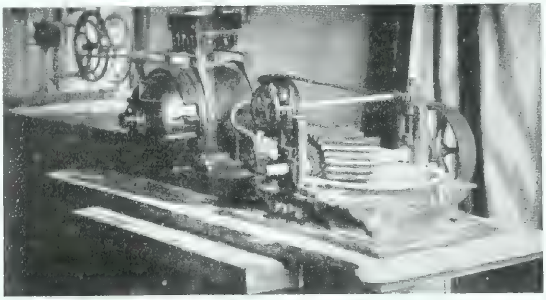


Fig. 2

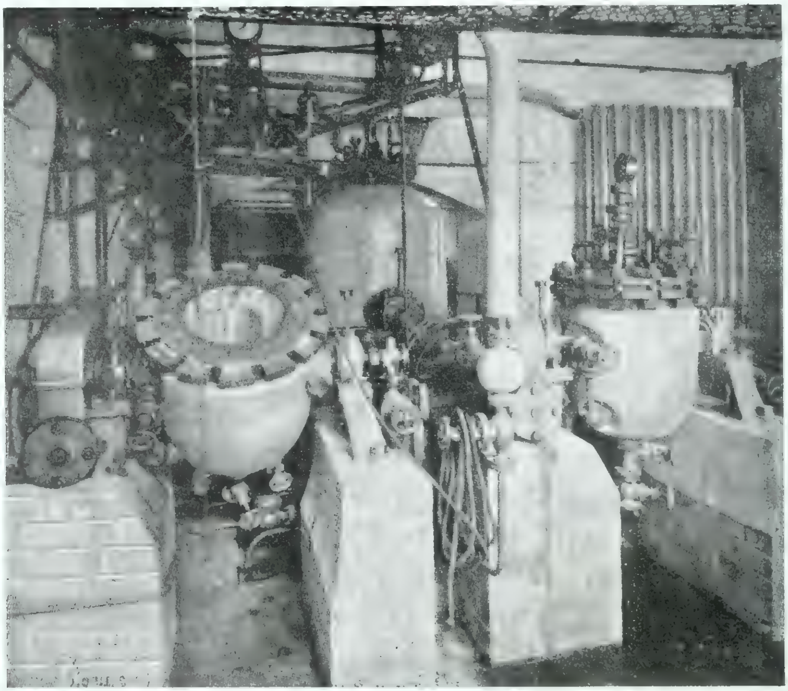


Fig. 3

As already stated, this apparatus serves for preliminary tests, often for the purpose of determining what we should not do; they furnish a certain point of departure for the limits of the reaction and for the product which they can furnish. The material to be cooked is reduced in a small Joachim beating engine, shown in Fig. 2, which will take a charge of only 0.3 kilos, or less, and which has proved highly effective in the disintegration of cellulose samples of all kinds, even samples of cellulose card, to cellulose pulp. The compact character of this installation will be apparent at a glance.

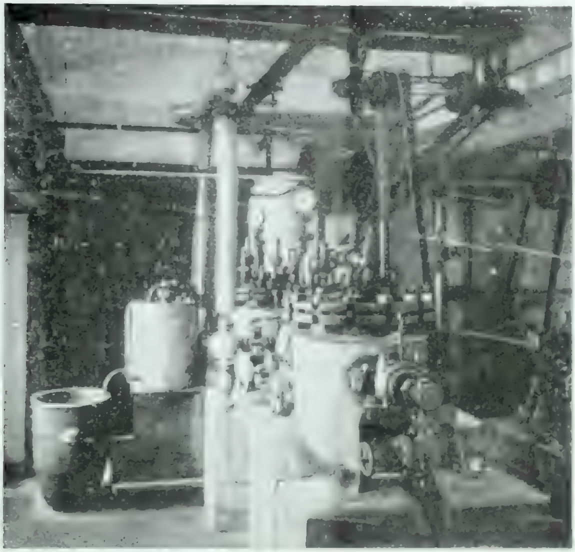


Fig. 4

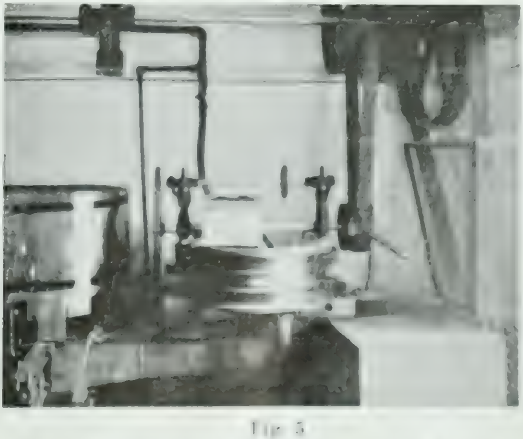


Fig. 5

As Fig. 5 shows, we have a second cooking stage, in which the dimensions are somewhat extended. These digesters hold about 30 to 40 liters. (The lecturer explained their construction).

In the autoclave equipment, shown in Fig. 3, gas heating was employed, which was sometimes quite difficult to regulate and which was certainly not adapted to reproduce conditions in cellulose cooking with direct steam heat. Consequently the apparatus of the second stage has been equipped with direct and indirect steam heating. Not only this, but a successful effort was made to construct the apparatus to revolve, for the reason that especially is scientific tests, provision should be made to insure the uniformity of the lye composition in all parts of the apparatus, so that in taking a sample a true average sample of the lye would be obtained. There was also the point to be considered that in some manufacturing processes, for instance in the manufacture of soda cellulose, rotary digesters are employed. For these reasons the experimental station must also be equipped with rotary digesters. The construction was comparatively difficult because the speed of a motor of 1,800 revolutions had to be throttled down to four revolutions a minute. Thus with the help of worm gearing, proved quite successful. I desire to make use of this opportunity to express my most sincere thanks to Superintendent G. Sureth, who subjected the plans for the digesters and armatures to expert revision, which made the work of setting up the apparatus much easier for me. The equipment was supplied by the manufacturers at first cost.

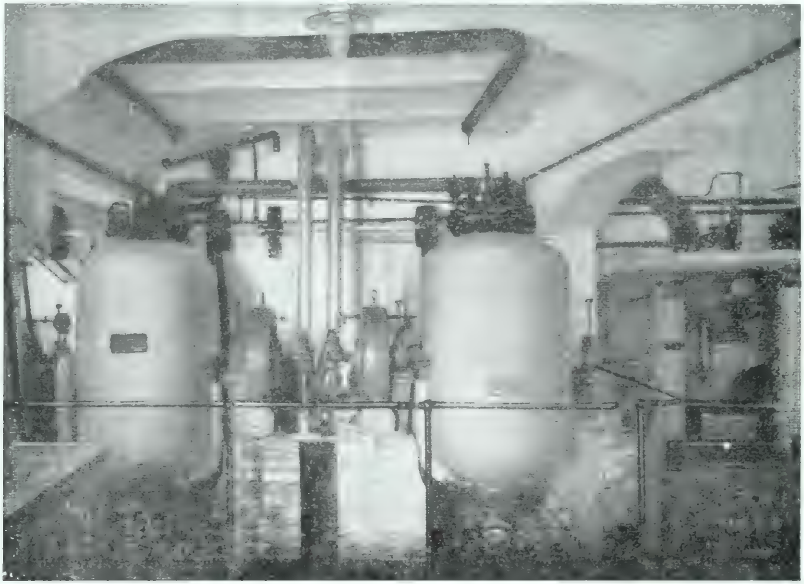


Fig. 6

These apparatus are particularly suited for series of experiments through which reactions may be quantitatively observed. They are for instance especially adapted to obtain an oversight of consumption of sulphurous acid. In Fig. 4, I show how, with such an apparatus, portable coolers and receivers were connected, making experimentation very convenient.

The apparatus holds from 5 to 6 kilos of wood. For further testing of the products, this must be disintegrated, so that the yield could be further determined. For this desintegration there is another beating engine, which is shown in Fig. 5, chosen with regard to the size of the model to be found on the market. It holds 1 to 2 kilos of cellulose at one charging and is equipped with bronze fittings, so that bleaching tests can also be conducted in this beater. (This model differs fro apparatus used for experimental work in American

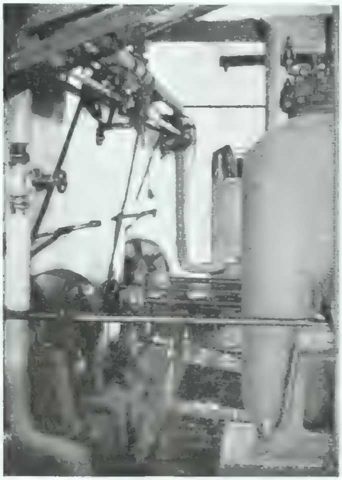


Fig. 7

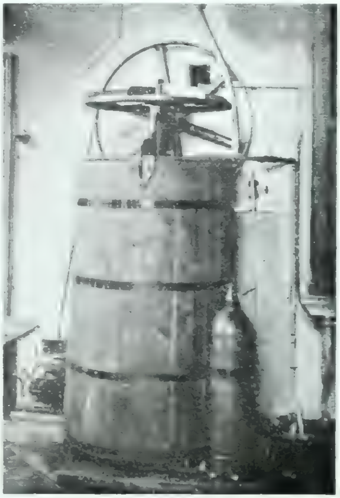


Fig. 8

laboratories, being a trifle small, but the tub may be sufficiently large for small determinations.

This completes the sketch of the apparatus of the intermediate stage. In Fig. 6 is shown the larger apparatus in which takes place the verification tests of the results obtained on a small scale. A capacity of half a cubic meter to 600 litres will not be regarded as excessive, but with the size of the vessels the cost of the investigations increases marvelously, and also the times within which the contents of such a digester can be worked up, so that if we must have still larger quantities of material, it will be practicable to so produce them that several experiments can be made, one after another.

As regards the digesters of 500 to 600 liters capacity, one, the sulphate digester, is provided with stone lining. It has moreover again direct and indirect heating, like the small digester Fig. 3.) and is, like this one, a rotary cooker. This construction of the plant has shown important advantages. I am very glad that I assumed the considerable expense for this, because it has turned out that only by this rotary movement is it possible to obtain a complete mixture of the lye with indirect cooking. To give an example after rotating five times, the temperature of a Mitscherlich cooking increased from the original 116 degrees to 121 degrees, a considerable difference, which proves how necessary it was to except this inequality in the temperature for scientific experiments. It might perhaps have been accomplished by other means, but I preferred the rotary movement for the reason that it might be desired to test processes in practice in which rotary digesters are used and the soda digester was moreover to be developed as a rotary cooker.

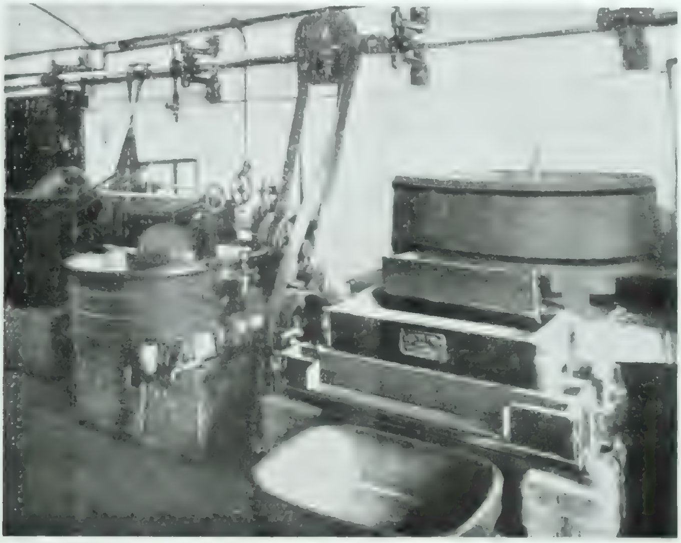


Fig. 9

In order that you may obtain an insight into the construction and operation of the digesters, I desire

Fig. 10

to show you, in Fig. 7, the rear side of the digesters. The digesters turn out 50 to 60 kilos of cellulose and in a week, working industriously, enough material is accumulated to suffice for a brief test on a paper machine in the plant.

In Fig. 8 is shown how the necessary lye for the operation of the digesters is prepared. In the apartment above the mechanical laboratory, a lye vat is set up, an ordinary wooden tub at the bottom of which, from a flask, the sulphorous acid is introduced through a perforated lead pipe, while a stirring apparatus keeps the lime emulsion in motion. We have been able to produce lyes of very varied character and we are not troubled by the fumes of the sulphurous acid. The apparatus is furnished with a close-fitting lid and a ventilating pipe leads into the chimney. The lye prepared in this apparatus flows through a lead pipe into the apartment below, so that we have no further trouble with the transportation of the 400 liters of digester liquid. On the left side, below the portable motor may be seen another motor which is available for other purposes—for instance, for the operation of the small beating engine.

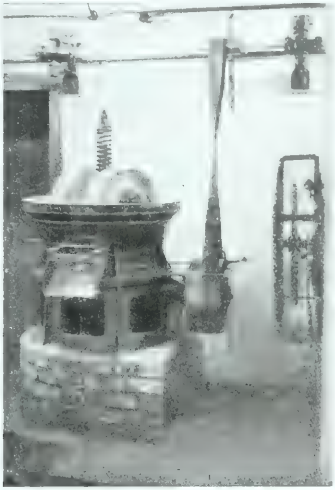


Fig. 11

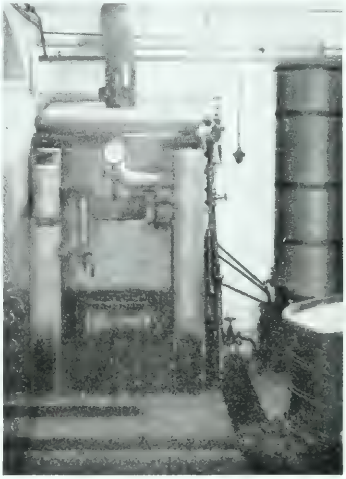


Fig. 13

Fig. 9 shows the beating engine belonging to these digesters. It has a capacity of 11 kilos, equipped with bronze fittings and a washing drum, so that the stuff coming from the digester can be thoroughly washed. The stuff must still be subected to a separation, so that we may form an idea as to whether the cooking process effects perfect desintegration. For this purpose a simple "Wandel" screen is installed, so that splinters and slivers can be separated from the pulp. The pulp then passes into a straining tub, from which it goes to the press. This straining is regarded as important because unstrained pulp in the bleach may, under some circumstances, lead to erroneous conclu-

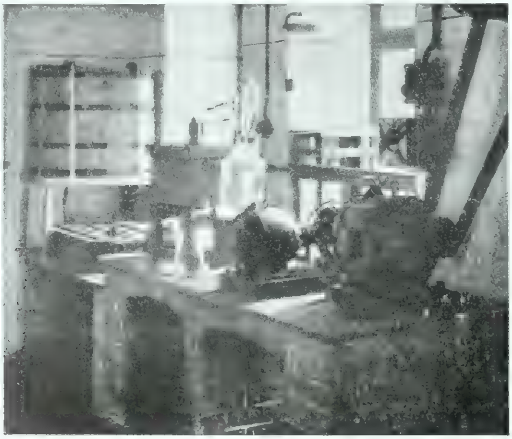


Fig. 12

sion in regard to the consumption of chlorine, so that it appears advisable to previously segregate the slivers and the unreduced material. On the other hand, there is the possibility, owing to the proportionate number of slivers as compared with good pulp, of arriving at a wrong idea as to what the disintegrating process has accomplished.

In Fig. 10, the further treatment of the pulp is shown. The whole of the separated material is formed into press cakes in a very convenient and efficient press, a gift of the firm of Gebrueder Ebart, of Spechthausen. When all the pressed cakes have been made, they are broken up small and again thoroughly mixed in large receptacles. Hereupon we make the dry test and can thus arrive at a very accurate yield determination.

In Fig. 11 may be seen a kollergang, which serves to further reduce the slivers for the purpose of investigation, and is in addition used for bleach and color experiments. This is the apparatus that is considered necessary for the working up of the cooked stuff. It is considered desirable however to insure completion in another direction, that is for bleach tests. Chloride of lime solutions are preferably employed for bleaching, but in view of the comprehensive developments of the electrolytic bleach, it appeared necessary to institute comparison with other bleaching systems, and provision has therefore been made for working with sodium hypochlorite worked up from common salt solution, and it is also possible, according to the most modern process, the Biliter process, to produce chlorine and caustic soda and use it for bleaching purposes.

In Fig. 12 such a bleaching apparatus is shown (which the lecturer explained). The apparatus was placed at my disposal, as a loan, by the firm of Siemens and Halske. In order to carry out the experiments and utilize the city supply of electric current, it was necessary to install a transformer, which may be seen in the picture. The whole forms, in my opinion, a very desirable completment to the rest of the cellulose apparatus.

I wish still to show how the steam generation for the experiments is managed. We have, as shown in Fig. 13, a very compact steam boiler, which is known as a nonexplosive Lilienthal tubular boiler, that nevertheless has a heating surface of 6 square meters and which, fired with gas, heats up very rapidly, this, for scientific purposes, is exceedingly satisfactory. In like manner, by turning off the gas the apparatus is very speedily put out of operation. The boiler generates up to 22 kilos of steam heat per hour and has a working pressure of fifteen atmospheres. Moreover all the digesters are constructed for this working pressure, so as to permit of experiments within the widest limits. A water purifier is connected with the steam boiler.

Fig. 14 shows a complete ground plan of the plant. I am indebted for this plant to my assistant Dr. Johnson, who has not only proved of great service in the arrangement of the premises but in connection with the entire plant.

I believe you will have gathered from the illustrations that we have a very well equipped plant. You will therefore understand me when I say that, having such an aparatus, we can enter with pleasure on our work on the solution of the most troublesome cellulose problems, and that we cherish the hope of contributing something to their final elucidation.

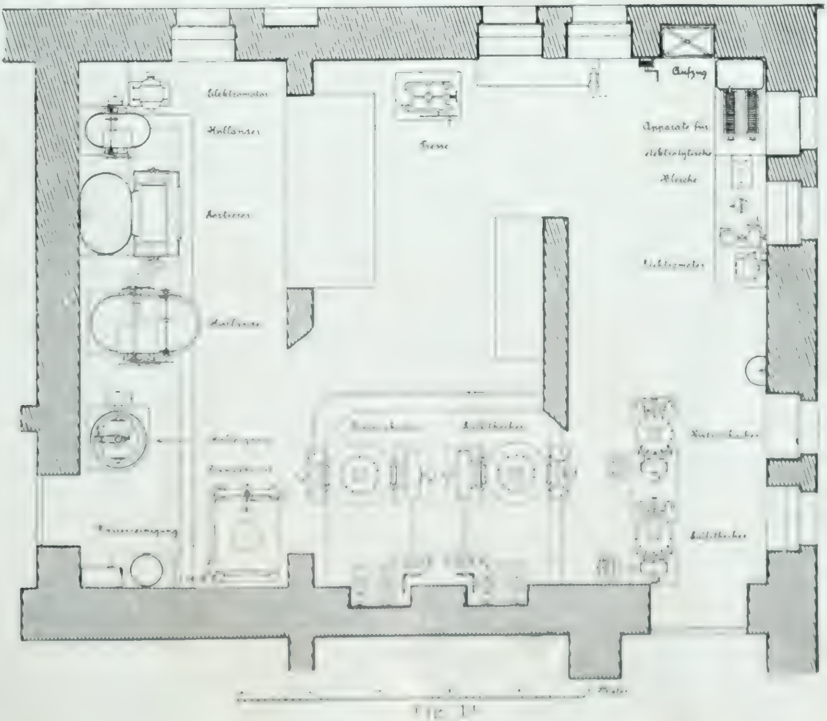


Fig. 14

UNITED STATES NOTES

(Special to Pulp and Paper Magazine)

It has been announced that the Union Bag and Paper Co. is to operate the Allen plant at Hudson Falls, N. Y. which has been closed for more than a year. This news will be welcomed by the business men of the community, as well as the paper-makers, a number of whom have been out of employment the greater part of the time since shutdown took place. The plant which originally contained five paper machines will begin operation of two machines with the possibility that a third machine will be started later. At the time the plant was closed it was contended that the size of the machines made it impossible to operate them at a profit. The machines were of the 48-inch type.

* * *

The United States District Court has been petitioned to permit and early sale of the Potsdam Paper Mills property at Potsdam, N. Y. The Company was forced into bankruptcy by the involuntary petition some months ago. The mills are in condition to start at the present time and steam is kept up in the boilers. The plant has been closed since it was forced into bankruptcy.

* * *

It is stated on good authority that about 30 cars of machinery have already been purchased for the plant which is to be built for the Economic Power and Products Company of Philadelphia, at Greenwood, Miss. This will be forwarded just as soon as side tracks can be laid so that it can be unloaded immediately upon arrival in Greenwood. It is estimated that the new pulp mill will cost about $250,000.

* * *

The second steamer that has come to Boston from Germany since the war interrupted commerce, was the Swedish freighter Portos which arrived several weeks ago with a cargo of wood pulp. She came from Memel—the northernmost town in Prussia and a centre of the Baltic lumber trade. Captain Peisson reported that the Portos had been ordered to Stornoway by a British cruiser, and that she was delayed there three days for examination of papers and crew. After leaving Memel on January 27, the Portos called at Helsingborg and later at Madira for coal. Of the steamer's cargo of 8,169 bales of wood pulp, 4,219 bales will be discharged here.

* * *

R. J. Buck and C. E. Buchholz, of Watertown, N. Y. have, during the past forthnight been looking over terminal sites in Ogdensburg with a view of handling pulpwood through that port for all of the big pulp mills in Northern New York City.

* * *

Travelling at the rate of 110 revolutions per minute a fly wheel weighing 6,000 lbs burst in the engine room at the plant of the Rockford Paper Box Board Company, Rockford, Ill. hurling huge fragments to right and left, smashing another fly-wheel weighing 4,000 lbs., crashing one chunk of iron through the ceiling to the floor above and still another fragment into an adjoining room, where it struck a workman named Dehoskl and inflicted injuries from which he died two hours later.

The ownership of 120 shares of stock in the Gould Paper Co., Watertown, N.Y., was argued before the appellate division of supreme court for their department at Albany. William L. Babcock and another as executors of the estate of their brother, Lewis E. Babcock, claimed the stock, but this claim was denied by G. H. P. Gould, of the company, who contended that no transfer was actually made to Mr. Babcock. The present value of the stock is about $20,000.

* * *

Advices from Great Works, Me., state that pulpwood is coming in with a rush just now, 700 cords per day being what the Penobscot Chemical Fibre Co. is averaging. Put that into dollars and cents and you will find that this company is quite a liberal distributor of the coin of the realm to the people of Great Works, and up and down the Penobscot River.

* * *

Fire broke out recently in the McNairn Paper Mill at Dansville, N.Y., but the prompt response of the fire department and the efficient work of the firemen saved the brick mill structure from total destruction. The loss in the mill proper was slight, but the warehouse and contents was a total loss. The loss is between $10,000 and $15,000. The mill is owned by James McNairn of Canada.

* * *

What is looked upon as a forerunner of new business for the Eaton-Dikeman Company, of Lee, Mass., was the shipment last week of a carload of blotting paper to South America. This firm has already shipped to all parts of the world in the past.

* * *

The Sulphite Department of the Union Bag and Paper Company's plant at Glens Falls, which had been operated five days a week the past two months, has resumed the six day schedule. The entire plant of the company with the exception of the bag department which will close down on Saturday owing to a scarcity of paper, is being run on full time.

* * *

The Whiting-Plover Paper Company, with mills at Stevens Point, Wis., has just entered into a contract for a part of its product, which will represent not less than $3,000,000 for a period of four years, from July 1, 1915, to July 1, 1919. This matter has been pending for some time, and is a sub-contract made with the Middle West Supply Company of Columbus, Ohio, manufacturers of government stamped envelopes.

* * *

In its column, "Looking Backward," the Watertown (N.Y.) Times prints the following: "March 5, 1890. The Frontenac Paper Company began the manufacture of paper at their mills on Fish Island on Saturday. On the seventh of last September, 1889, a large force of laborers and stone masons began turning the ground, blasting the rock and building the foundations for the large brick buildings that now adorn the river bank. The financial part of the business will be under the efficient care of F. W. Spicer, the books and office work will be looked after by Louis Lansing. Thus is added another large industry of $50,000 capital to the village of Dexter."

BRITISH TRADE NEWS

SPECIAL TO PULP & PAPER MAGAZINE

Some time ago "Elephant Grass" (Pennisetum purpureum) was receiving attention for the purpose of discovering if pulp could be produced. In 1913 a report was issued that a fairly good paper could be made from the grass, but owing to the light and bulky nature of the raw material it was thought at the time that the stems could not be exported at a profit to Europe from Africa. But if an industry could be started in East Africa, it was suggested that it might prove profitable. Recent reports that have reached London now state that there are enormous quantities of this "Elephant Grass" available for the production of pulp and experiments have turned out satisfactory. They are being continued with the co-operation of the authorities of the Imperial Institute in London and a paper mill. But the commercial prospects of a scheme will largely depend upon the cost of transport and the maintenance of a supply of limestone suitable for causticating soda ash. Should the manufacture of pulp on a commercial scale prove feasible, the discovery will be of great importance, particularly as the supply of grass is practically inexhaustible and the land on which it grows is now regarded as "bush". A recent survey was also made of Uganda, where there are considerable areas of forests, as a result of which it has been found that the resources are greater than was ever anticipated. The experiments now being carried out are followed with great interest.

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The annual conference of the British Paper Makers' Association of Great Britain and Ireland will be held on April 22. The principal topics for discussion will be the situation regarding Aniline Dyes and the wages and labor conditions in paper mills in the United Kingdom. The latter will be dealt with without reporters being present so that nothing may leak out for the information of the trade unions. Since war broke out the Association has been keeping a careful watch on the imports of German and Austrian paper and suspicions have been reported to the Government. Attempts made to obtain licenses to import have also been opposed and defeated. Recently a constant stream of inquiries for paper formerly made in Germany and Austria has been dealt with and as a result an exhaustive classification of paper made by members of the Association has been prepared so that any person is immediately put in touch with the manufacturers. Photographic paper, greaseproofs, chemical filter papers and various other kinds are now being turned out in England to replace the German product. Photographic paper has been particularly successful. In addition to all the recent innovations the Trade Board has been in constant consultation with the Association. It is reported that the Association is in a sound financial position. The result is that a test case is being fought over the railways advancing their rates by [illegible] per cent.—an increase which seriously affects paper mills. After the conference the annual banquet is to be held and some prominent industrial men are to give addresses.

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The President of the Paper Makers' Association of Great Britain, who is President also of John Dickinson & Co., Ltd., presided the other day at the annual meeting of his company, which owns two mills in the county of Hertfordshire. Mr. Evans in his address said that in consequence of the war the year 1914 had been an anxious one. The fluctuations in all prices had been very great and in many cases it had been difficult to secure materials on any terms. On the declaration of war there was a temporary rise in the price of paper, especially in the cheaper qualities—newsprint increasing in price from two cents to 4½ cents—but owing to a general reduction in demand prices soon fell to the pre-war level, in spite of an universal rise in the cost of production. Luckily John Dickinson & Co. was in a strong financial position, and was able to pay cash for esparto, wood pulp and other materials, and thus maintain a sufficient supply to keep the mills running. Having referred to the large number of men serving in the Army and Navy, Mr. Evans said the company was manufacturing with considerable success goods to take the place of German products and had it not been for congestion on the railways and in shipping out of the country, they would not have shown a falling off of nearly 2 p.c. in their sales. At Croxley mill the new electric plant was working well and they were effecting a saving of 20 per cent in the consumption of coal per ton of paper. Coal was now up 45 per cent in cost. Turning to the finances the President said they proposed paying 9 per cent for the year. The profits amounted to £80,393 13s 3d, as compared with £87,794 1s. 9d. for 1913. As to the prospects of the company, at the present moment the import of papermaking materials and the exports of the company's products caused the greatest anxiety, as shipping was most difficult to get and some of the freights were as much as 300 per cent. up. But although all costs of production were greatly increased there was at present no clear indication of a general rise in the selling prices of their goods. They hoped, however, that means might be found to obviate most of these difficulties in the current year.

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The British National Dye Scheme promoted by British Dyes, Ltd., was not fully subscribed to, contrary to expectations. The opposition to the scheme proved too great. However, a meeting of the applicants for shares has been held in Manchester and promises were made by the subscribers to increase their subscriptions by 50 per cent. It remains to be seen if this course will be taken. Meantime the scheme is depending on this promise and if it is not fulfilled the whole matter may be abandoned. In the scientific world everyone is against the scheme. In the commercial world the scheme has been promulgated, capital partly provided and government [illegible]. The scheme is wanted badly and the sooner it is working the better for the paper and textile industries. Mr. T. Parker Smith, a member of the British Paper Makers Association, spoke at the Manchester meeting and said the scheme must go forward at all costs. They must not surrender to the Germans [illegible] industry. He hoped the subscribers would put confidence in the directors who had already surmounted many formidable difficulties and might, he thought, be trusted to bring the scheme into successful operation.

PULP AND PAPER NEWS

The Monarch Paper Co., Limited, have removed from the Sun Life Building, Toronto, to 419 King street west where they have large premises and fine storage facilities. They are stocking the principal lines in coarse papers and will devote considerable attention to imported ranges as well as light manufacturing. The company have installed the most up-to-date machinery for the making of adding machine rolls and all paper roll specialties in standard sizes, such as telegraph, cash register, telephone, etc. Mr. Lou Houpt of Buffalo, President of the Company, spent a few days recently with E. A. Crippen, manager, getting things under way. Mr. Houpt states that special machinery is now being made for other lines which will be announced later. Special attention will be given as Manufacturers Agents in the matter of terms and tonnage contracts. The Monarch Paper Co. obtained a charter about a year ago and have developed a steadily growing business.

Alex Taylor, of Toronto, has been appointed secretary of the Lake Superior Corporation, the Algoma Steel Corporation and the other companies. He succeeds Thomas Gibson of Toronto who recently resigned and is now President of the Lake Superior Corporation. Mr. Gibson is still Secretary of the Spanish River Pulp and Paper Co.

Edwin A. Cole, of the wholesale paper firm of E. A. Cole and Co., 311 St. Paul street, Montreal, died recently while away on a business trip. At Haileybury he was seized with pneumonia. He was one of the oldest members of the Dominion Commercial Travellers' Association and was sixty-five years of age. He leaves a widow and five children.

Calendars, Limited, has been incorporated with head offices in Toronto and a capital stock of forty thousand dollars to carry on a printing, publishing, engraving and advertising business. K. Pollack, P. Frumharz, Max Cooper and Barnet Stone of Toronto are behind the new enterprise.

Welland D. Woodruff, President of the Lincoln Paper Mills Co., Merritton, who has been spending several weeks at Jekyll Island off the coast of Georgia, has returned home.

The Claybelt Printing and Publishing Co., of Cochrane, Ont. has been granted a charter, the share capital being ten thousand dollars.

At the annual meeting of the F. N. Burt Co., Limited which was held in Toronto recently, the annual report, a summary of which has already appeared in these columns, was adopted. President S. J. Moore of Toronto, presided and told the directors that he thought the report was the most satisfactory ever been presented in the history of the company and added that, in his opinion, the outlook had improved. Recent decisions of the United States Courts in confirming the position of the company in regard to certain patents for the manufacture of paper boxes, were stated to have a material relationship to the prospective earnings of the company. The economies of manufacture have considerably been affected by the introduction of the machinery in question, and it was intimated that the new processes would have an important bearing on future earnings.

Canada Fibre Board Co., Limited, of London, Ont., with a share capital of forty thousand dollars has been formed to import, manufacture and deal in all kinds of building materials. Among the incorporators are Wm. Buchanan, James. S. Ferguson, and Charles W. Coles of London.

As intimated some time ago, the pulp and paper manufacturers in Ontario have formed a Safety Association. Incorporation has just been granted by the Ontario Government under the name of the Ontario Pulp and Paper Makers Safety Association, with head offices in Toronto. The directors are W. P. Gundy and I. H. Weldon, of Toronto, C. H. L. Jones of Sault Ste. Marie, Carl Riordon, Montreal and H. R. Erskine, Ottawa. The object of the corporation is to promote and carry on the work of prevention of accidents in pulp and paper mills and in any other industries, which may for the time being and from time to time be assessable by the Workmen's Compensation Board, in the same insurance group as pulp and paper mills and generally to represent employers and employees engaged in such industries in connection with the administration of the Workmen's Compensation Act in Ontario.

I. H. Weldon of Toronto, President of the Provincial Paper Mills Co. and also President of the Canadian Pulp and Paper Association, left last week on an extended trip to the West, accompanied by Mrs. Weldon. He will visit Winnipeg, Calgary, Edmonton and other leading centres on business and will spend a few days on his ranch near the latter city. Mr. and Mrs. Weldon will go on to California and the Panama-Pacific Exhibition before returning home.

Mrs. Patterson, wife of R. L. Patterson, manager of Miller and Richard, Toronto, died on April 8 after an illness of several months. Newspaper men will in particular feel her loss as it was at her home "Fernwood" that the annual bowling tournaments took place. Her husband, three sons and two daughters survive. Mrs. F. A. Ritchie of the firm of Ritchie and Ramsay, coated paper manufacturers, Toronto, is one of the daughters.

A. M. Thorne and Co., 45 Colborne street, Toronto, dealers in paper, paper bags, twine, etc. recently made an assignment to A. C. Neate, 32 Church street, Toronto, who is inviting tenders for the stock, which will be received up to April 19.

The annual meeting of the Pacific-Burt Co. will be held in Toronto on April 26. The report of the past year's operations shows the net profit to be $69,998, a decrease of $3,570 as compared with a year ago. Dividends on common and preferred stock remained unchanged totalling $58,500. The sum of $20,000 was transferred to reserve as against $11,500 in 1913 leaving $27,472 to be carried forward, a decrease of $8,501. The total assets of the company are placed at $1,563,074, an increase of $19,326.

The Markets

CANADIAN MARKETS

The market conditions in news print, which have been rather quiet for some time, are improving, as the advent of spring brings more advertising to the newspapers, which are resuming the normal number of pages prevailing before the outbreak of the war. There has been some price cutting going on and a few low quotations made, but a leading member of the trade stated this week that a better understanding all around would soon prevail, and quotations resumed that will be more equitable. The export returns for January, while they show a decided falling off in news print, chemical pulp and ground wood from the month of December, 1914, which was one of the largest in that year, are above the exports of January, 1914, which is regarded as a good omen for future business. The reason, that December exports were so heavy, was owing to special Christmas numbers and extra editions. The amount of news exported in January was $1,085,019, which represents a twenty-five per cent decline from the previous month, but sixteen per cent higher than in January, 1914. In the eleven months of the fiscal year ending March 31st, the complete returns not yet having been tabulated for the whole twelve months, the figures show Canada shipped abroad $11,485,438 worth of news. Of this, the United States took $9,850,719 being the largest customer of the Dominion, Australia took $604,900 worth, New Zealand $416,686, Great Britain $155,763 and other countries combined $457,370.

There are a number of inquiries for ground wood and prices remain about the same, water conditions on the other side of the line being good. In January, Canada shipped abroad $239,758 as compared with $457,883 in December, 1914 and $265,750 in January 1914. The market for ground wood varies according to conditions across the line, and there is no branch of the trade subject to greater fluctuations. In sulphite pulp, the situation remains about the same but some predict that, owing to uncertain conditions abroad there is bound to be an increase in price in the near future. Exports of chemical pulp in January amounted to $393,778, and for the eleven months of the fiscal year total $3,823,824. Of this amount the United States took $3,695,070.

Mechanical pulp for the eleven months of the fiscal year total $4,049,450, of which the United States took $2,493,500, Great Britain $1,485,550 and other countries $70,400.

In the book and writing line mills are fairly active and business has been picking up considerably. A number of spring catalogues have been issued which has tended to keep plants busy. Annual statements and reports have been published by banks, insurance and financial companies which has also helped things along in the better grade of papers.

Wrappings are in fair condition and buying is somewhat brisker, now that the Easter holidays are over, as stocks in many instances had run quite low. There has been an increase in prices of glazed kraft of thirty cents per hundred to jobbers, while the demand for kraft generally is good.

It is understood that the T. Eaton Co., Limited, of Toronto and Winnipeg, who recently received bids for supplying that firm with brown and grey kraft paper for the coming year, have awarded the contract to the Brompton Pulp and Paper Co. of East Angus, Que., The contract calls for about seven hundred tons to be delivered as required. While the price has not been learned definitely, it is said that the figure for brown kraft was around three and a quarter cents and for grey about three and a half.

Wholesale houses report that April business in several lines will be up to last year for the same month. Of course, orders are smaller, but travellers have been going after trade all the more diligently. Glassine and grease-proof papers, manufactured in Canada for the first time are now on the market, ~~and are~~ expected to replace the imported products which, since the war, have been largely shut off. In the rag and paper stock arena things are stationary. There is a fair demand for clean mixed papers, folded news and over issues. In other respects matters are moving steadily but no great activity characterizes the situation.

Quotations, f.o.b. Toronto, are:—

Paper.

News (rolls), $1.80 to $2.00 at mill, in carload lots.
News (sheets), $2.00 to $2.10 at mill, in carload lots.
Book papers (carload), No. 3, 4.00c to 4.25c.
Book papers (ton lots), 4.25c to 5.75c.
Book papers (carload), No. 2, 4.50c.
Book papers (ton lots), No. 2, 4.75c to 5.50c.
Book papers (carload) No. 1, 5.00c to 5.50c.
Book papers (ton lots), No. 1, 5.50c up.
Sulphite bond, 6½c. to 7½c.
Writings, 4½c up.
Grey Browns, $2.10 to $2.75.
Fibre, $3.00 to $3.75.
Manila, B., $2.25 to $3.25.
Manila, No. 2, $3.10 to $3.50.
Manila, No. 1, $3.35 to $4.00.
Unglazed Kraft, $3.40 to $4.50.
Glazed Kraft $4.25 to $5.50.

Pulp.

Ground wood pulp (at mill), $15 to $16.
Ground wood, $21 to $24, delivered.
Sulphite (unbleached), $38 to $43 del. in Canada.
Sulphite (unbleached), $39 to $44, delivered in U.S.
Sulphite (bleached), $54 to $58.

Paper Stock.

No. 1 hard shavings, $2.00.
No. 1 soft white shavings, $1.75.
No. 1 mixed shavings, 50c.
White blanks, 97½c.
Heavy ledger stock, $1.60.
Ordinary ledger stock, $1.30.
No. 2 book stock, 50c.
No. 1 book stock, [illegible]
No. 1 Manila envelope cuttings, $1.25.
No. 1 print Manilas, 65c.
Folded News, [illegible]
Over issues, [illegible]
No. 1 clean mixed paper, 27½c.
Old white cotton, $2.50 to $2.75.
No. 1 white shirt cuttings, $5.75 to $6.00.

Black overall cuttings, $1.70.
Thirds, blues, $1.50.
Black linings, $1.75.
New light flannelettes, $5.00.
Ordinary satinets, 95c.
Flock, $1.05.
Tailor rags, 90c.
Manila rope, 2c to 2¼c.
No. 1 burlap bagging, 90c.

Quotations f.o.b. Montreal are:—

Book—News—Writing and Posters.

Roll News, $40 to $43 per ton for large orders; $45 to $50 per ton for small orders.
Ream News, $45 to $47 per ton for large orders; $50 to $60 per ton for small orders.
No. 1 Book, 5¼c to 5¾c per lb.
No. 2 Book, S.C., $4.50 to $4.75 in large quantities; $4.75 to $5.50 in small quantities.
No. 3 Book, M.F., $4.00 to $4.25 in large quantities; $4.40 to $4.50 in small quantities.
Writings, 5c to 7½c.
Sulphite Bond, 6½c to 8½c.
Writing Manila 5c.
Colored Posters, 4½c to 5¼c per lb.

Wrappings.

Grey Brown, per 100 lbs., car lots, $2.25 net; 5 tons $2.45; 2 tons, $2.55; 1 ton, $2.65; less, $2.75.
Red Brown, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, 3.15; less, $3.25.
B. Manila, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, $3.15; less, $3.25.
No. 2 Manila, car lots, $3.10; 5 tons, $3.20; 2 tons $3.30; 1 ton, $3.40; less, $3.50.
No. 1 Manila, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton, $3.65; less $3.75.
Kraft, $3.75 to $5.00.
Fibre, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton $3.65; less $3.75.
Fibre, $2.75 to $3.50.
Manila, B., $2.50 to $3.25.

On large orders to the jobbing trade some manufacturers are quoting 10 per cent off the above prices on wrapping.

Pulp.

Sulphite easy bleaching, $43 to $45 per ton.
News quality, $41 to $42 per ton.
Bleached sulphite, $54 to $59 per ton.
Kraft pulp, $3.60 to $4.00.
Ground wood, No. 2, $22 to $24, delivered in United States.

NEW YORK MARKETS

(Special to Pulp and Paper Magazine)

New York, N.Y., April 11, 1915.

Continued mild weather with a plenty of water in the rivers and streams has affected the ground wood market to a great extent. As stated in the last issue of Pulp and Paper Magazine, mills making their own pulp were operating almost to capacity. Conditions have not changed to any great extent, except that there are more offerings now than there were two weeks ago as those mills making their pulp for sale have been accumulating considerable surplus stocks and in many cases are offering good inducements to prospective buyers. As a matter of fact, inquiries have not been over-numerous and from the price standpoint, the general market is considered rather weak. Values have actually fallen off about a dollar a ton during the interval, and a good grade can now be had for about $16 at the mill. Makers are in hopes that the weak prices will not prevail very long as they are all anticipating a raise in price with the advance of the spring and early summer, when water is generally low throughout the country and mills have to draw heavily on their supplies in hand.

Buying in chemical pulps during the interval has been comparatively light, as the principal consumers in the country are not only well supplied with stocks, but are balking at the higher prices being asked for Scandinavian sulphites. Local importers in discussing the situation this week with your correspondent, stated that it would not be very long, in their opinion, before the American consumers would have to pay the prices asked by the makers abroad. "Of course, these prices appear rather high at present," said one, "but taking all things into consideration, prices are not as high as I expected to see them when the war in Europe first broke out. The Scandinavian mills are very firm in their quotations, and if they keep this attitude up we Americans will have to pay the prices." The foregoing pertains chiefly to Sulphites, Sulphates and Krafts. In the case of the latter the demand is very weak, as consumers are only buying supplies in a hand-to-mouth manner.

The local paper stock market remains quiet and uninteresting. Many packers who have heavy stocks on hand are willing to sacrifice same at very low prices. It is expected, however, that the market will, in a few days show signs of strength; as collections so far this spring have been rather light, if compared with corresponding periods of previous years. Rag stocks, both foreign and domestic, are not much better off than waste papers, only that prices are somewhat stronger. With the exception of roofing stocks, the demand in all grades is anything but satisfactory. Consumers throughout the country are not running their mills on a full basis, and as they have, in most cases, considerable stocks on hand, there are comparatively few inquiries being made at the present time.

Local paper dealers and manufacturers, when interviewed during the past week by your correspondent on the general situation, were almost unanimous in the belief that the low mark in buying had been reached and a steady and sure increase in sales would be noticed from now on. Whether these predictions will materialize remains to be seen, but the fact that many mills throughout the country are beginning to make preparations for increasing their output is an indication that they are all of such a belief—though it may be that stocks on hand at the mills are not as heavy as they should be at this time of the year. Anyway, there is a decidedly better feeling in the local trade, and according to the visitors to the city during the interval from other large paper manufacturing and distributing centres, the same is the case elsewhere. The foregoing applies to almost all grades, except newsprint, which, owing to the heavy supplies on hand, the lessening up in the demand and the keen competition for new business, has reflected a rather weak market. Consumers are fighting hard for reduced prices, and it is understood that several large contracts have been placed during the past week or ten days at very good figures. In the case of side run news, the market is strengthening under the influence of a fairly active inquiry. The tissue situation continues about the same as reported two weeks ago, though there has been a slight easing in demand—but not in price. White tissues are maintaining 40c to 42½c while manilas are firm at 40c. Book papers are without change. The demand for the several different grades is still light, but there is every indication of an early improvement. Prices, however, have remained firm, and no change is looked for either way. Writings, Bonds, Linens and Ledgers are maintaining their own. While sales are not heavy, they compare favorably with the sales in corresponding periods in previous years. Preparations are being made in Holyoke and surrounding cities to increase the weekly output of the mills with the view of meeting the increasing demand. Kraft papers are showing a steady improvement over a month ago, and the outlook is fair that the prevailing situation will continue for some time to come. Board, though still weak in both price and demand, are showing signs of an improvement, and it is the concensus of opinion among the local dealers that the present values will be advanced in the near future.

Pulps.

Ground Wood, No. 1, $19 to $20, delivered.
Ground Wood, No. 2, $15 to $16, delivered.
Unbleached Sulphite, dom., 2.20c to 2.75c, delivered.
Unbleached Sulphite, impt., 1.80c to 2c, ex dock, N.Y.
Bleached Sulphite, domestic, 3c to 3.40c, delivered.
Bleached Sulphite, impt., 2.60 to 2.90, ex dock, N.Y.
Easy Bleaching, impt., 2.05c to 2.15c, ex dock, N.Y.
Unbleached sulphate, impt., 1.80c to 2.05c ex dock N.Y.
Bleached sulphate, impt., 2.75c to 2.90c, ex dock, N.Y.
Kraft Pulp, 1.80c to 1.95c, ex dock, New York.

Paper.

News, rolls, transient business, 2.10c to 2.15c, f.o.b.
News, rolls, contract renewals, 2c to 2.10c, f.o.b.
News, side runs, 2c to 2.05c, f.o.b. New York.
News, sheets, 2.20c to 2.35c.f.o.b. New York.
Book papers, car lots, S. & S.C., $4 to $4.50, f.o.b.
Writing paper, extra superfine, 13½c to 17c, del. east of Miss. River.
Writing paper, superfine, 11c to 13c, del. east Miss R.
Writing paper, No. 1, fine, 9c, del east Miss. River.
Writing paper, No. 2, fine, 8c del. east Miss River.
Writing paper, engine sized, 5c to 8c, east Miss. R.
Bond paper, 5c to 24c, delivered east of Miss. R.
Ledger paper,5c to 25c, delivered east of Miss. R.
Linen paper, 8c to 18c, delivered east of Miss. River.
Manila jute, 4½c to 5c, delivered.
Manila, wood, 2.30 to 3c, delivered.
Kraft, No. 1, (dom.) $3.60 to $3.75, f.o.b. New York.
Kraft, No. 2, (dom.) $3.35 to $3.50, f.o.b. New York.
Boxboards, news, $23 to $26 per ton, delivered.
Wood pulp board, $40 to $42.50 per ton, delivered.
Boxboards, straw, $21 to $24 per ton, delivered.
Boxboards, chip, $22 to $25 per ton, delivered.
Tissue, fourdrinier, 50c f.o.b. New York.
Tissue, white, cylinder, 40c to 42½c, f.o.b. New York.
Kraft, imported, 3.95c to 4c, ex dock, New York.

THE BRITISH MARKETS.

(Special to Pulp and Paper Magazine.)

London, March 31, 1915.

Never within the memory of the oldest British papermaker have mills had to face such conditions as are existing to-day in the United Kingdom. The mills here, as nearly everybody knows, are largely depending on the importation of raw materials to keep them going and, consequently, the submarine warfare which the Germans have declared on the harmless merchant ships has completely upset shipping on the Norwegian and Dutch ports. The risk is considered great, but on the British side shipping is very little hampered. On the other hand, tonnage is very scarce and loading and discharging cargoes very slow work. Added to these difficulties are high freights which have increased from 100 to 200 per cent, war insurance, bonus for crews, slow railway transport, and scarcity of labor. These are all extra charges on mills. Then chemicals have advanced in prices, pulps are dearer, dyes are scarce, and labor is demanding higher wages. So it may safely be assumed that the British mill owner is at present in anything but a bed of roses. To make matters worse they are slow in demanding higher prices owing to the competition of foreign mills. Esparto mills are now shut down for two or three days in the week owing to lack of raw material. Newsprint mills are just kept going, as the demand for paper for newspapers at home and abroad is steady. Three new Sunday papers have been started in London and these will add to the consumption of newsprint. Fine printing and writing paper is finding a good outlet. Wrapping, packing, greaseproof, and other papers are also doing well. Butter paper is scarce. Photographic paper is now being made by one mill with much success, as also are chemical and other filter papers. Some mills are trying to put on 2 1-2 and 5 per cent on the prices, but will not undertake contracts at a fixed price. Indeed, contracts can be terminated in a week, if necessary. The dullness of trade, however, hampers mill men in demanding an extra percentage to cover the extra cost of production, but it is anticipated that within another month when orders pour in more plentiful the papermaker's chance will come to recoup himself.

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Pulp prices are up to the extent of 15 per cent, and very little business is doing, though inquiries are numerous. Prices are very firm owing to the shipping difficulties. Sulphite Easy Bleaching is receiving much attention, but strong sulphite as well as sulphate is lacking patronage. Ground wood is inclined to be higher in values and inquiry is reported as good. Scandinavian reports show that business with America, France and Holland, is quiet and dependence is being placed on British mills for orders. Scandinavian shippers have agreed not to carry cargoes from German ports owing to the blockade. The prices are as follows, c.i.f. British ports:—

Bleached sulphite (No. 1), $61.00 to $71.60.
Sulphite Easy Bleaching, $48.80 to $50.00.
Sulphite news, $44 to $45.
Unbleached soda, $46 to $47.
Soda kraft, $44 to $47.
Ground wood, moist, $13.30 to $14.
Ground wood, dry, $29.40 to $30.

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Esparto shipments to British ports are remarkably small. Sellers are slow to do business owing to the difficulty of estimating the cost of transport. Rags are getting scarcer and inclined to be dearer for some grades. Waste papers are also hardening.

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In the chemical market caustic soda is dearer, having risen nearly $5 a ton. Alum is up a dollar extra per cwt. Bleaching Powder is steady, but stocks are not large. [illegible] is up 15 17 cents. [illegible] is unchanged. Sulphur is active at the recent advanced quotations.

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There is now a good demand for China Clay and prices are put up so as to meet the high freights. French and Italian chalks are also dearer for the same reason. There is now a scarcity of Bauxite from France. Barytes cannot be quoted the prices are so irregular and the demand so good. Oxalic Acid is 22 cents a pound. Mineral White is steady. Chloride of Zinc is dearer owing to the firm and steady demand in the spelter market.

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It is only now that the British millowner is really feeling the effects of the war. He has never felt them until now and things would have been going on as usual were it not for the uncivilized conduct of the German in sinking Dutch, Norwegian, Swedish, Danish, and American boats which have no earthly connection with the present war.

TRADE INQUIRIES.

The Department of Trade and Commerce has received inquiries as follows:—

377. **Triplex paper board.**—A London firm in a position to place large contracts for supplies of triplex paper boards wishes to secure the representation of a Canadian manufacturer.

381. **Paper, etc.**—A firm of general merchants and commission agents in Cochin, India, wishes to get into correspondence with Canadian manufacturers of wrapping and other paper. He would also like to hear from exporters of products and manufactures seeking an outlet in India.

399. **Fibre board; South American agents.**—A British firm of manufacturers' agents would like to hear of a Canadian firm manufacturing fibre board (samples at Department of Trade and Commerce), which is used in the manufacture of boots.

413. **Wood pulp.**—A French firm is claiming to have big prospects in his regions for Canadian manufacturers of wood pulp. Must be perforated to meet French customs requirements.

442. **Papers.**—A Glasgow importing firm is desirous of opening up business with Canadian manufacturers of box-makers' and book-binders' papers, fancy and plain, also imitation leather, enamel boards.

449. **Paper.**—A Glasgow firm of paper agents and merchants will be glad to receive samples and quotations on the following papers: Blotting, book, carbon, catalogue, coated and enamelled, colored, corrugated, gummed, kraft, label, lithographic, news, tag, tissue, cover, drawing, envelope, featherweight, fibre, glazed, typewriter, waterproof, waxed, wrapping and manila, writing and ledger.

450. **Paper.**—A Glasgow house in the paper business are buyers of kraft browns, grease proofs, vegetable parchments, M.G. cap bag papers, wrappings and tissues. Samples and quotations asked for.

451. **Paper.**—A Glasgow firm would be glad to have samples and quotations on: envelope papers, label papers, M.G. sulphite papers, in heavy weights, waterproof papers (if not oiled or waxed) and toilet papers.

452. **Paper.** — A Glasgow firm of papermakers' agents and wholesale paper merchants are desirous of receiving samples of all classes of paper that Canada can offer. They are willing to take up the agency of a mill, and believe that a trade could be done if quotations and quality are equal to the goods made elsewhere.

RIORDON PAPER CO.'S PROFITS GREATER.

The total profits of the Riordon Pulp and Paper Company, Limited, at the annual meeting which was held at noon on Wednesday, April 7, were shown to be $375,862.62 for the year ended December 31st, 1914, compared with $309,679.42 in the previous year, an increase of $66,183.20.

From the amount mentioned were deducted $65,951.44 on account of reserve for depreciation, and $62,832.58 on account of interest paid in the twelve months under review, a total of $128,784.02, leaving a balance of net profits amounting to $247,078.60, as opposed to $228,073.20 in 1913, an increase in this particular of $19,005.40.

Mr. Charles Riordon, the president, pointed out that the report ought to be particularly gratifying to the shareholders, as naturally business has been very much unsettled owing to the war.

"During the early part of the war the price of pulp advanced materially," said Mr. Riordon, "but during the last few months the demand has fallen off and prices are lower.

"We anticipate, however, an improving demand for the company's product during 1915, and hope to make as good a showing for the current year.

"Your directors beg to report that owing to the existing financial situation they have been unable to secure a satisfactory price for the bonds they have authority to issue."

The old Board was re-elected as follows:—President, Chas. Riordon; vice-president, Carl Riordon; S. Pemberton, W. G. White, F. W. Avery, C. A. Read and J. G. Riordon.

SUPPLY OF PAPER FOR ARGENTINE NEWSPAPERS.

The Department of Trade and Commerce is in receipt of a copy of a communication from a reliable source in Buenos Aires in which reference is made to the reluctance shown by leading Argentine papers to appear, in however indirect a manner, to take sides in the war, and it is pointed out that a curious reason for this exists in the supply of paper for the use of the newspapers. This supply has gradully been absorbed by one or two leading Germans, and a large proportion of the paper for printing purposes is supplied from German mills. Since the war prevented the regular export of goods from Germany, the Germans who had contracts with the Argentine papers have been compelled to order supplies from the United States in order to execute their contracts.

The proprietors of Argentine papers are thus largely in the power of the German paper suppliers, and fear lest any offence against Germany and the Germans in the shape of an article sympathetic to the Allies' cause might result in a stoppage of supplies, which could not be obtained elsewhere in the present condition of affairs.

It has been considered advisable to bring this to the attention of the Canadian paper mills, who should no doubt be able to make up any shortage in the Argentine supplies.

NEW AUSTRIAN PAPER TESTING STATION.

A conference has taken place between representatives of the Austrian cellstuff paper mills with the object of establishing a testing station for paper. It is conjectured that this step may prove the forerunner of a new combination of the Austrian paper industry.

Pulp and Paper Magazine

A Semi-Monthly Magazine Devoted to the Science and Practice of the Pulp and Paper Manufacturing
Industry with an Up-to-date Review of Conditions in the Allied Trades.

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VOL. XIII. MONTREAL, MAY 1, 1915 No. 9

Mars

We Canadians have not been insensible to the terribleness of the struggle waging on the other side of the Atlantic. We have felt for the brave Belgians, the heroic French, for our own English kindred and the sons of the other colonies who have volunteered for service. We have felt for our foes, too—the poor misguided German peasants and Austrian farmers, prey to the mad love of power in the military caste. The horrors of the conflict come down upon us in mournful oppression.

But realization of the grimness of the war has come to us only in the past week. In furious engagements in Belgium scores of officers and hundreds of men, part of the lifeblood of our Dominion have fallen, never to rise. From now on Canada will be on the firing line as never before. Thirty thousand of her bravest and best will battle with renewed intensity. Thirty thousand Canadian homes will contain loving hearts overflowing with anxiety. Eight million people will wait in deeper suspense than ever to learn the news from the front.

A nation's honor to our brave dead, a nation's honor to our courageous living, and a nation's sympathy to those bereft! And may the cloud of battle lift soon, and may we have back among us the sons who have gone out from our shores.

Why Not the Main Point?

In this issue appears a condensed report of that portion of the hearing of the Board of Railway Commissioners in Ottawa on April 14th and 15th which is of immediate interest to the manufacturers of pulp and paper. Mr. A. D. Huff appeared before the Board on behalf of the Canadian Pulp and Paper Association, and for the very capable way in which he handled the case the industry in general owes him warm commendation and gratitude. He showed how such a burden as the railways propose to place upon the industry would be well nigh unbearable.

In fact, in view of the increased competition from Scandinavia which is likely to arise after the war, very serious re-adjustments would be necessary if there were any new charges to shoulder. Further, he showed that present rates are in many cases out of all proportion to the service rendered, and constitute a tax upon the industry as they stand.

In its straightforwardness and clearness Mr. Huff's address stood out in striking contrast to the evidence which has so far been submitted by the railway companies. The case of the latter has been built upon the practically unsupported statement that they need more money. Five sittings in all have been held and not yet has there appeared anything more than fragmentary evidence upon the main issue.

It is notable, too, that while the point has been raised by the Dominion Government representative, Mr. J. F. Orde, K. C., and others who have appeared before the Board, as to the propriety, under the Railway Act, of the procedure, this feature has so far been carefully avoided by the railway attorneys. Whether the procedure is entirely proper or not, the effect has been to put the public on the defensive. Thus, instead of the onus of proof being on the railways, as in the Western Rate Case, the procedure has placed the public in the position of having to show that railway rates should not be higher. This is a situation which we do not believe was contemplated when the Act was framed; nor could this result have been anticipated by the Commissioners when they agreed to hear the application in its present form.

The difficulty and danger of the situation are immensely enhanced by the fact that for some reason or other the "defendants" have had their attention withdrawn from the main issue (as to whether or not the railways need and are entitled to greater revenue) and have been giving consideration to such matters as the ability of various industries to stand increased freight charges, and the parity of rates between various points.

It has been our hope that we might be in a position to comment on the arguments of the carriers in support of their claims for increased revenue. But this privilege is denied us. Even yet the main question has been untouched by the railways. No analysis of earnings, no individual profit and loss statements, no comparisons of capitalization per mile, revenue per mile and cost of operation per mile—the only basis upon which the applicants can hope to build up a case and which the Board will undoubtedly wish to take into consideration—are yet forthcoming. Is it that the contention of the roads is so poor that it will not stand the light of publicity, or are they so sure of their ground that they feel they can sit back and complacently await the outcome?

The progress of the case up to this time has not tended to impress the public with the validity of the railways' contentions. It is to be hoped that before the final hearing the railways will have placed their case fairly and squarely before the Commissioners. They must do this before they can hope to win the full sympathy of the people.

Patriotism

In the midst of national sacrifice, in the very hour when unanimity among all parties and beliefs in the country should be absolute, the worst element of our political system is working to impede and disrupt the country. Certain politicians have even gone so far as to name the day on which our disloyalty would be consummated—Election Day.

The reason outwardly assigned by those favoring an election is petty enough. It is alleged that senatorial representation must be adjusted before the work of Parliament can proceed satisfactorily. But no one except the out-and-out-politicians believes that an election is necessary to safeguard the liberties of any section of the people or of all the people.

Just now, thinking men the country over are as one in considering the proposal. The Pulp and Paper Magazine has no political offiliations, and it can testify to a spirit of opposition in every shade of political opinion in the pulp and paper industry. Men who have never voted Liberal express themselves as willing to desert party simply by way of showing their resentment of the affront.

Not another country in the world, from Austria-Hungary to Great Britain is giving a moment's consideration to divisions on political lines when such great issues as at present confront every nation, are at stake.

Says the Journal of Commerce, Montreal, April 23rd:

. . .. the arguments against the bringing on of the election are so strong and conclusive that we feel they will in the end prevail, and that the conspiracy—the word is not too strong—against the interests of the country will fail. Apart from purely party reasons, the soundness of which is more than doubtfut, not a single argument can be advanced to support a dissolution at this time, or in the early future. An Associated Press despatch from London in last evening's papers, dealing with the political situation in England, must furnish food for serious thought to all in Canada who have given any degree of approval to the idea of an early dissolution. It shows clearly that in the mother country nobody in any position of responsibility would for a moment consider such a preposterous proposal as the holding of a general election, even though, so far as time limits are concerned, there would be much more excuse for such an appeal there than there is in Canada. Of the cordial cooperation between the leaders of the two great parties in England the London correspondent says:

> "It is only at rare intervals nowadays the partisan politics appear to cause even a ripple in England, and the leading Conservatives like A. J. Balfour and A. Bonar Law are working enthusiastically with the Liberals in the prosecution of the war and the many issues of raising revenue, adjusting trade to war conditions, and the countless other problems of the period."

The Canadian Parliament has more than a year and a half of its life to run. In England the life of Parliament is near its end. But so general is the feeling against dissolution in war time that it is quite probable that by general consent the term will be extended by a special Act to authorize the postponement of the election.

NOTES ON ACID PLANTS

By LEO SCHLICK, M.E.

(Concluded from April 15th Issue.)

As explained previously, it is an absolute necessity to cool the gases down to a low temperature so as to obtain a proper absorption. The cooler the water used for the absorption of sulphur dioxide the more dioxide it will absorb.

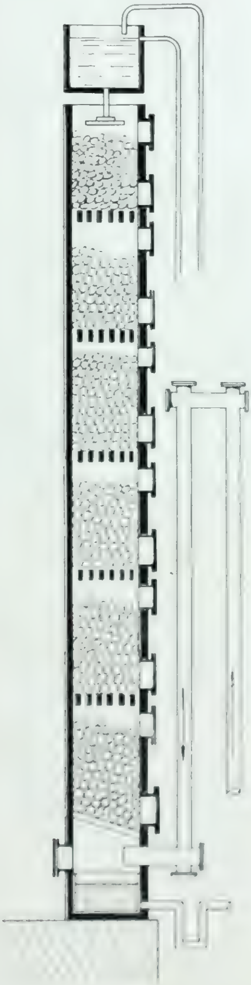


Fig. 10.

One volume of an aqueous solution saturated with dioxide contains:

At 0 degrees Celsius	68.861	parts of volume of SO_2	
10 " "	51.383	"	"
15 " "	43.564	"	"
20 " "	36.206	"	"

The specific gravity of an aqueous solution saturated with SO_2 is:

At 0 degrees Celsius	1.06091
10 " "	1.05472
20 " "	1.02386

Fig. No. 10 represents the improved Mitscherlich open tower. It is of 5 to 8 feet diameter, from 50 to 140 feet high and is divided up in storages. It is a peculiarity of the Mitscherlich tower to overcome all the resistance offered in the burners, pipes and the lime stone contained in the tower by the application of physical laws. It may suffice to mention that the difference of the temperatures in the syphon-like gas pipe leading to the tower and the difference of the pressure in the tower itself create sufficient suction to overcome the friction head mentioned. As it is evident that the atmospheric temperature is [illegible] having influence upon the draft and the absorption proper, the cooling action of the syphon pipe has been dispensed with and artificial means for the production of the draft were provided for.

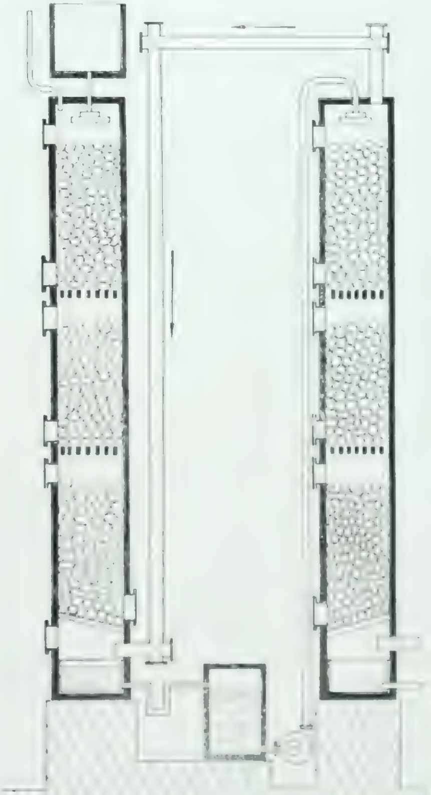


Fig. 11.

A welcome means is the employment of steam ele vators which were placed on the top of the tower, or the employment of fans.

The tower is divided up into a series of stories each one containing a charge of limestone, marble or dolomite. This storey system is of utmost use for the refilling and for the supervision of the absorption. Mounted on the top of the tower is a water reservoir provided with an overflow which feeds the tower with a continuous spray of water. In order to distribute the water properly over the stones the inside of the towers is fitted with wooden rings spaced at intervals of from 3 to 6 feet. These prevent the water from running down the walls without moistening the stone. The sulphur dioxide gas enters the tower on the bottom, passes through the bottom grate and ascends to the top until being more or less completely absorbed.

Thus the process of absorption acts in the contra flow style, the aqueous solution of dioxide running downward, and the dioxide gas ascending and forming bisulphite with same under the influence of the limestone. The percentage of lime contained in the acid depends upon the temperature of the monosulphite, that is to say, the higher the temperature, the greater the percentage of the base, and the lower the temperature the less the percentage of the base. Owing to the formation of sulphuric acid, the limestone just above the bottom grate will become scaled, which has to be washed off by means of a washing contrivance, which is placed underneath the grate mentioned. The bisulphite collects in the lead-lined bottom of the tower, and from here is conveyed to the recovery system in order to be strengthened to the degree required. This will be explained later on when dealing with this important portion.

Whilst steam jets and fans were welcome means for regulating the draft, the loss of gas in the Mitscherlich towers led to the design of the Ritter-Kellner towers, as illustrated in Fig. 11.

These work in a series of two. Both towers are closed at the top. The tower shown on the left carries a water reservoir which feeds the distributing box. The gas charged into it is the dioxide which has not been absorbed in the neighboring one. The acid derived from the left tower is pumped to the distributing box of the tower on the right, thus being exposed to the strong gas coming from the coolers. As this system works in the contra flow style, it is to be regarded as a clever modification of the Mitscherlich tower. It has the advantage of preventing any undue loss of gas, if not over-loaded. Also, the towers are of a smaller size. Their combined absorption surface of course has to be the same as a Mitscherlich tower of the same capacity. Also these towers are preferably provided with grates spaced so as to allow for a proper maintenance and to carry a certain portion of limestone or dolomite.

The chemical action of sulphur dioxide, water and limestone is as follows: The cold water trickling from the top absorbs dioxide, thus forming sulphurous acid as per the formula $H_2O + SO_2 = H_2SO_3$.

At the same time the surface of the moistened limestone is under the action of the SO_2 and forms monosulphite as per —

$$Ca\,CO_3 + SO_2 = Sa\,SO_3 + CO_2$$

At the bottom of the tower a solution of $Ca\,SO_3$ in $H_2\,SO_3$ and water collects, the constituents of which mixture vary greatly with the quantity of water used, the temperature of the water or the monosulphite, respectively, the kind of base employed, etc.

Fig. No. 12 illustrates the multiple low-tower system. Like the Ritter-Kellner towers, it is independent from the temperature of the atmosphere. Every one of the small towers can easily be charged from the top.

Figure No. 12 demonstrates the style of acid circulation and it is to be noted that in practice the pipe connections for gas and acid are arranged so as to put every one of the towers in and out of operation without disturbing the acid-making process. This is obtained by providing for a series of inter-connecting pipes.

The multiple tower system has many interesting features as compared with single or duplex system. Thus, for instance, the temperature of the acid can easily and individually be regulated between two compartments, which is of importance in respect to the percentage of the base and the lime. Also provision can be made to admit relief gas from the digesters to every tower or to admit the cooled spent liquor from the digesters in order to strengthen the acid at will. The maintenance of this absorbing system is simple, as the charging with limestone is greatly facilitated by the small height of same. A disadvantage is the necessity of many small acid pumps.

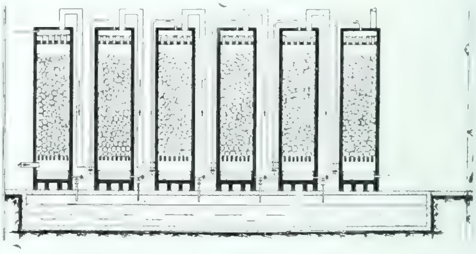


Fig. 12.

Low tower systems largely found employment in the beginning of the development of the sulphite industry. Several of them operate in Austria, a still larger percentage in Scandinavia, and as the Ritter-Kellner mills were erected on this continent they were introduced by the sulphite specialists of those times. From a chemical point of view they are a rather perfect contrivance, are not expensive to construct and can easily be housed in the acid plant building.

The idea of employing compartments or chambers has been used in various systems, and not only in conjunction with limestone and dolomite, but with limemilk. Before going into the lime milk systems we will occupy ourselves with the multiple tank system devised by Dr. Kellner.

Fig. No. 13 demonstrates this apparatus, which is composed of a series of tanks charged with limestone. Each tank is provided with a false bottom, underneath which a coiled lead pipe discharges the gas through small holes.

The water entering the top tank becomes saturated with dioxide, thus forming sulphurous acid which, in conjunction with the limestone, provides bisulphite liquor. This solution is then strengthened by passing through the other tanks with a similar equipment by gravity. The velocity of the liquid through the system is controlled by cocks which are placed at the bottom of each tank. The sulphur dioxide gas is forced into the lowest tank and from here passes the other tanks until completely absorbed. The vent pipe on the top of the upper tank serves to dispose of the carbonic acid formed by the reaction, etc. Unlike in the tower system where the trickling water passes the gas and moistens the limestone, the gas in the Kellner tank system is forced through the liquid in form of bubbles, which increases the absorption per unit of cubic space occupied.

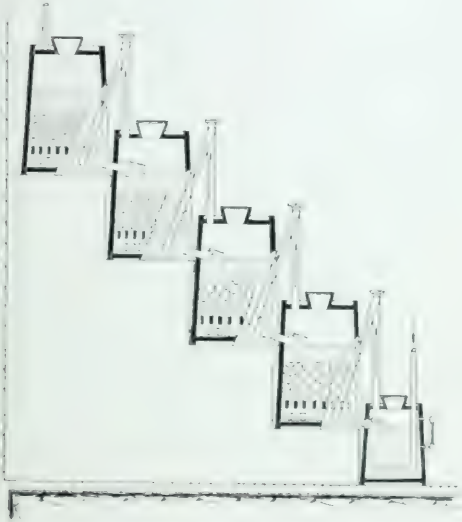


Fig. 13.

Whilst until now we occupied ourselves with the description of the various systems employing limestone or dolomite, the following acid systems are known as the "lime milk" systems. The principle of all lime milk systems is to force or suck gas through an aqueous solution of quick lime, which is to be classified as slaked lime. Inventors, as Flodquist, E. Partington, Dougall, Behrend, Porak, Dr. Frank and others, have successfully built and operated such systems. As an interesting case, we will quote the Porak system. (See also Kirchner "Das Papier Halb Stoff Lehre." Page 329.) For those who are not acquainted with the German language we will give a description of this system, which is to be regarded as a very ingenious one and which has effectively solved the washing so much emphasized by the author.

"A" represents the flat sulphur burner; "B" the valve; "C" the connecting pipe between burner and pre-cooler; "D" an ascending gas pipe; "E" is a water-injector acting as an elevator which creates a suction in the sulphur burner and pre-cooler and a compression towards the absorbers. "F" represents the discharge pipe of the pump "G," which is fed by the tank "H." The gas ascending from the pre-cooler is mixed with water in the elevator, and pressed into the washing tank "H." All the sublimate carried by the gas and the small percentage of sulphur trioxide contained in same is retained in the washing tank in which these unwelcome impurities are accumulated. The cleaned gas passes then through pipe "J" to the cooler "K" and from there is conveyed into the lower tank, being charged with weak bisulphite liquor. Here the gas is absorbed readily, which is facilitated by an agitator. The gas not yet absorbed in the lower tank is led to the upper one, which is charged periodically with an aqueous solution of quick lime. Nitrogen, carbonic acid, etc., escape through the vent pipe. As also the upper tank is provided with an agitator, which revolves slowly, the chemical reaction is complete. The weak liquor derived from the upper tank is periodically charged into the lower one, where it remains until the constituents of the acid wanted are reached. Porak paid particular attention to the cooling and washing end, and therefore obtained an excellent acid. The relief gases and the spent liquor separated from same were mixed along with the liquor and the gas, and thus effectively reclaimed.

As mentioned above, the charging of the Porak tanks is periodical. They can, however, easily be arranged to work continuously when a syphon-pipe is attached to the lowest absorber. In such a case the lime water has to run into the upper tank in a continuous flow. This also applies to the weak liquor to be charged into the lower tank.

It will be of particular interest to learn that compressed SO_2 gas contains more gas, that is, a richer gas per cubic measure, than gas under vacuum. Porak thus secured the effect of a 21 per cent gas by compression, with which he claimed that he produced an acid rich in free and low in combined. The sulphur consumption in his mills is about 11 to 11½ per cent, which is to be regarded as good.

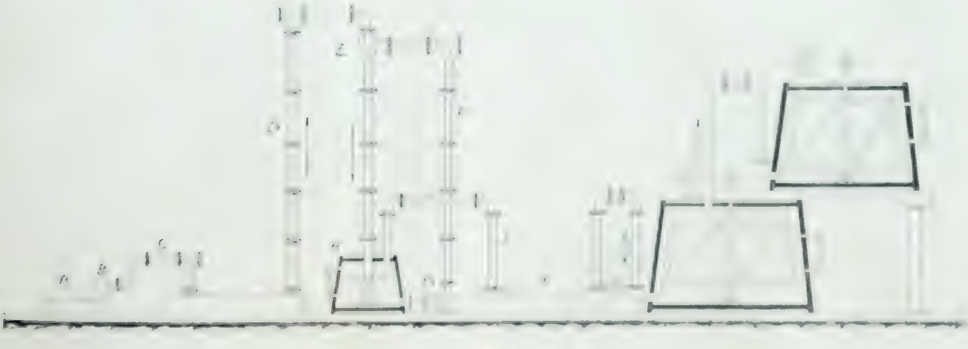


Fig. 14.

The scientist, Dr. Frank, has devised a tank system as shown in Fig. No. 15:

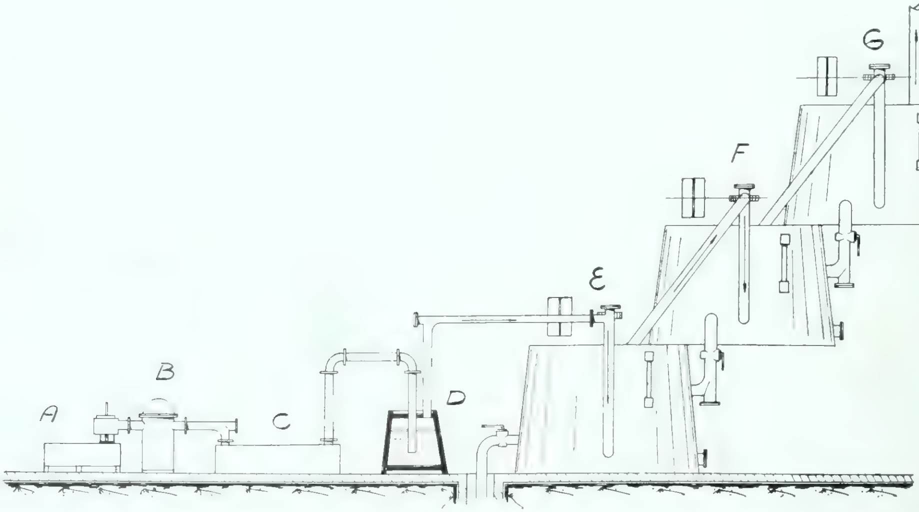


Fig. 15.

He employs flat wrought iron and water-cooled sulphur burners, which are provided with a water jacket. Adjacent to the burner is a sublimator to retain the sublimate until converted into gas. The burner is fed by compressed air, which is admitted in front and rear so as to mix the gas properly and to prevent sublimation. The compressed air is produced by piston compressors feeding a vessel to which the various burners are connected.

After having passed the cooler the gas is forced through a water-bath which retains all the sublimate and trioxide and then passes into the lowest absorber which, like the Porak tanks, is fitted with an agitator. Frank uses three tanks, in which the reaction goes upon the contra-flow principle. The upper tank is fed by a lime slaking tank, which also is provided with an agitator. The tank system Dr. Frank works periodically, the time to produce one charge being 3 hours, in actual practice as reached by the author. The constituents of a suitable acid for the Mitscherlich process are as follows 3.2 total; 2.1 free; 1.1 combined; 0.8 to 0.98 lime. This acid is strengthened later on by the recovery gas and liquor. The sulphur consumption is 11 to 11½ per cent. Dr. Frank uses lime, dolomite and magnesia as a base.

In order to save space, the Burgess and the Barker acid systems have been constructed. They are composed of high cylindrical tanks divided up into compartments. The reaction in the Burgess absorber is inconformity with the Porak and the Dr. Frank absorbers. The gas enters the lowest compartment at first and is distributed by means of slowly rotating agitators formed by a set of four pipes, and bronze blades attached.

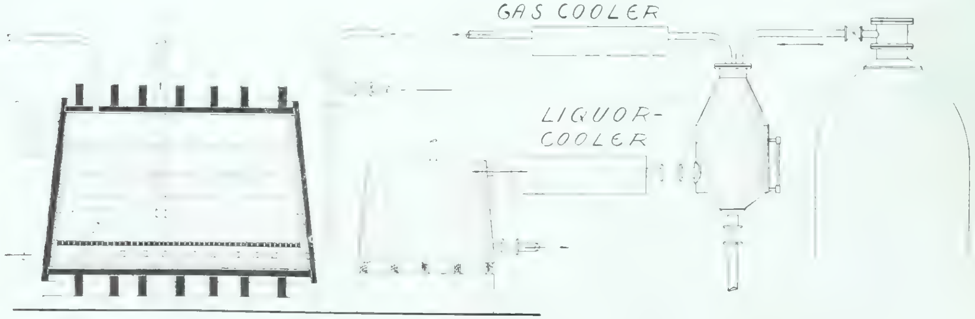


Fig. 17.

The liquor is thus saturated with the dioxide, and leaves the apparatus in a continuous stream. The gas not yet absorbed ascends to the next compartment, where it undergoes the second stage of absorption and passes finally into the top compartment where the absorption is completed. In conformity with the contra-flow, the aqueous solution of quick lime is fed into the top compartment and flows in a continuous stream into the lower absorbers. The whole system is either under vacuum or under pressure.

As a last prototype of absorbers, I am quoting the Barker bisulphite apparatus.

It is based upon the use of lime milk, and comprises a tank composed of four compartments and a tower for the absorption of the cooled relief gas. Absorption tower and compartment tank may be arranged as in the diagram or may be arranged separately.

The lime milk enters the upper compartment in a continuous flow and receives its dioxide in form of bubbles ascending from the perforated false bottom. The weak liquor runs to the next compartment by means of an overflow where it undergoes the same absorption process, and so on through the four compartments. From the lowest compartment the acid is allowed to flow into a distributing compartment, the bottom of which allows the liquor to trickle down into the absorbing tower where it is met by strong gas, and is thus strengthened to the percentage desired. The gas supply pipe for the apparatus is placed below the gas distributing plate of the tower from where it ascends to the compartments charged with lime milk. The gas charged into this class of absorber should preferably be compressed so as to allow for the maximum possible percentage of free sulphur dioxide in the acid. The tower has stoneware filling and acts as a surface absorber. It is stated that gas manufactured with the Barker bisulphite apparatus working in conjunction with a proper reclaiming (recovery) system, will produce an acid with one per cent combined and up to six per cent total and more.

Having dealt with the various prototypes of acid systems in general, we will explain the recovery of the gas being blown off from the digester during the cooking. As mentioned previously there occur gaseous accumulations in the top of the digester, this being due to the sulphur dioxide set free during the digesting, and to vapor.

These have to be blown off in order to decrease the pressure which otherwise would unduly interfere with the cooking process. Likewise a certain portion of the liquor has to be disposed of in order to take care of the expansion of the acid through the increasing temperature. When cooking in the Ritter-Kellner system, that is, with direct steam, the condensate of the latter will materially increase the quantity of liquor, and here also a certain portion has to be blown over through the relief. The SO_2 and the vapor represent a large percentage of sulphur. The aim of the pulp maker should be to recover this as fully as possible. For this purpose the over-blown accumulations are sent through a separator in which the dark liquor is separated from the condensed light accumulations and from the gas. The light liquor and the gas hereafter undergo cooling, and are used to strengthen the acid in the reservoirs or in the absorbers provided for the purpose.

Diagram No. 18 deals with the recovery of gas and liquor from Ritter-Kellner plants.

The accumulations first pass the separator where the dark colored liquor is drawn off and goes to the sewer. The gas then passes a cooler comprising a lead coil submerged in running water and from here goes into the absorber. The latter can be a tower filled with ordinary stones from the top of which the acid to be

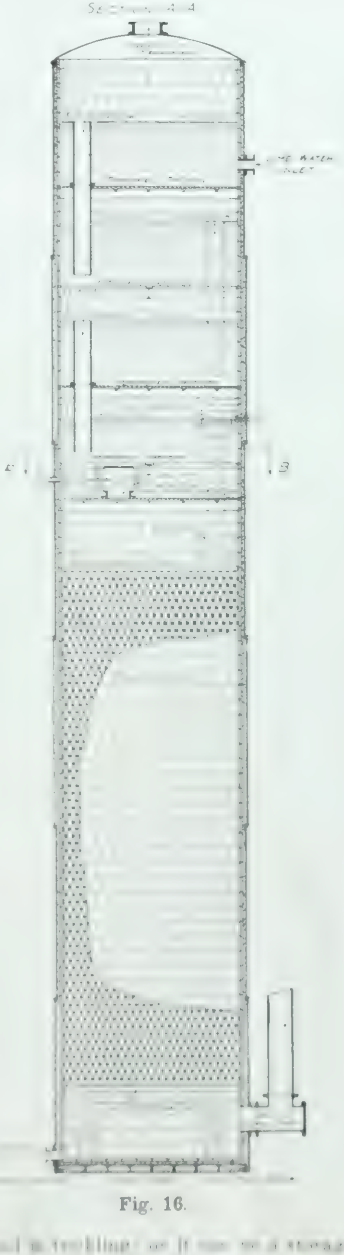


Fig. 16.

strengthened is trickling, or it can be a storage tank with a perforated bottom, allowing the gas to pass through the acid in the form of bubbles. The light colored liquor is also cooled and goes into a storage tank, so as to procure a continuous flow of strong liquor into the acid system. Mitscherlich mills, which cook the pulp as is known by means of steam-heated coils placed in the lower egg-shaped part of the digester, generally dispense with the separator, as there is no danger of blowing dark liquor into the recovery system. It is a general practice of producing an acid of uniform strength with the acid plant, that is, by burning sulphur or roasting pyrites and to accumulate same in storage tanks. Owing to the intermittently occurring discharge of relief gas and liquor, the relief gas is then either used alone for the strengthening or if the recovery end works continuously may be mixed with a portion of sulphur dioxide from the acid plant. From the cooled light liquor a certain portion is admitted to the absorber tanks or towers, whatever system may be used, so as to obtain a cooking acid of uniform strength. The acid produced in the acid plant has its proper amount of lime and combined when running to the recovery end, where tests are to be made periodically, in order to determine the quantity of recovery gas and liquid to be added. Larger plants with a great number of digesters generally work the recovery end a continuous style, as here sufficient recovery gas and liquid is always at hand.

At the beginning of the sulphite making as much as eighteen per cent and more of sulphur was used; we are now in the position to secure the same effect with ten to eleven per cent through the employment of an efficient recovery.

PAPER TESTING

Specimen Reports as Used in Some Leading British Mills.

By A. TEMPERLEY,

Paper Making Depart., Municipal Technical School, Lancashire, Bury.

(Written Specially for Pulp and Paper Magazine)

In reporting on customers' or competitors' samples of paper, mill chemists and outside analysts have different methods of expressing their results. Simple, and yet useful information is often omitted and has to be ascertained later by the busy superintendent. Also in technical articles describing research work dealing with examination of papers made and tested, vital information regarding practical aspects of the subject has often been overlooked. Readers of trade journals have asked for this to be supplemented before valuable tables of results could be fully utilized for comparison. Instances could be cited where the substance, composition, type of apparatus and method of making strength and other tests have been omitted in descriptions of paper testing, etc. Even rigid specications drawn up by large buyers of paper including Government Departments, essential data similar to above has not been stated.

Many papers are chiefly examined for the relative proportions of fibres and percentage of ash. Others more closely for substance, bulk, tensile or bursting strength and stretch. The same paper may require scrutiny for nature and degree of sizing and absorbency, acidity or neutrality, relative density or specific gravity and opacity, etc. Other samples of paper, including colored, coated and specialties, require an experienced investigator to reveal their properties and composition. In a series of ordinary papers the chief useful points for the mill chemist to report upon quickly are the approximate proportion of fibres, amount of ash, sizing, weight per area, thickness and relative strength. This information, when neatly tabulated, enables the busy commercial manager or mill superintendent to quickly survey the papers and enables him to give instruction for the right kind of counter samples and quotations to meet prospective customers' requirements. Or this data can be used to investigate and combat any complaints as well as to record any improvement in individual makings from the same furnish.

The alert mill chemist has all the apparatus ready overnight to deal with the samples of paper that arrive by the morning's mail, and this enables the price to be given a little later by wire or 'phone, if necessary. The samples which require testing are generally sent up to the laboratory with the customer's name or initials and the chemist numbers them for his own identification and record. Bits of the samples are boiled in labelled test tubes with a few drops of dilute soda to remove any size. After allowing to stand a short time they are washed and then emptied into a small unglazed mortar. The water is run off, and a few gentle pats of the pestle soon reduce them to a pulp. Small portions are picked out with a pin and mounted on a glass slide ready for the usual examination by the microscope. The ash is estimated at the same time by ignition in weighed crucibles. The substance and bulk (thickness) are easily found, and if necessary translated into foreign equivalents by reference to a table or by direct calculation. In the case of a small sample of irregular shape, which has to be returned, the substance is obtained without measuring, by weighing it and comparing the ratio with a similar piece cut from a standard sheet of known substance. The bursting strength is found by the Mullen apparatus or if a very small piece of paper on the Ashcroft tester. These instruments are kept in careful order and often compared on small rolls of standard papers. In the event of the enquiry expressing the strength on one of the numerous types of other paper testers used in this country and abroad reference is made to a special compiled table which gives the approximate equivalent strength for the particular class and substance of paper on the testing apparatus in question. The test for absorbency consists of weighing separately one or two small pieces of the paper and immersing them for one minute in cold water. After allowing a moment or two to drain they are gently pressed by the hand between a few sheets of Messrs. Ford's or Craig's make of double crown 60 lbs. white blotting, and immediately weighed. The water absorbed is averaged and expressed on the original weight. This procedure in ordinary papers, supplements the "feel," also the results obtained by the pen and other tests for comparing the relative sizing of different papers. For certain classes of papers, customers' requirements for absorbency for pasting and other purposes can often be met at a reduced cost of production by comparative tests and trials made on above lines.

Colored papers are regularly and specially investigated at the present time for type of dyestuffs used, whether anilines, paste, pigment or earth colors, also with a view of cost and conserving the stock or limited supply. When customers require special properties in addition to shade, similar to fastness to light, alkaline or acid pastes, etc., a list of suitable colors in stock is drawn up by the chemist if necessary for the use of the mill foremen.

The general report of a series or an individual test is made out by the chemist on a duplicate colored form, one part of which he retains and if possible attaches a bit of the sample for future record. The other copy is filed in the office cabinet along with the enquiry or order and being colored is conspicuous amongst the correspondence.

The following is a typical report on the paper used by the Government Recruiting Committee's Appeal for More Men during the present war, which has recently been distributed to every householder in the United Kingdom:—

REF. No. 1. DATE, March 1st, 1915. SAMPLES FROM:—British Recruiting Committee.
DESCRIPTION—Various.

	Samples Marked.	General Description.	Substance 20x30 480 s|s	Thickness 1-1000 inch.	Bursting Strength (Mullen) Lbs.	Absorbency of Water. %	Approximate Composition. %
1	Large Addressed Envelope	M. G. Casing	41½	$\frac{6}{1000}$	36	20	Chemical Wood 50 per cent. Mechanical Wood 50 per cent. No loading or starch.
2	Reply Envelope	M. G. Casing	28¾	$\frac{4\frac{1}{2}}{1000}$	21¼	32	Chemical Wood 50 per cent. Mechanical Wood 42 per cent. Esparto 5 per cent. Ash 3 per cent.
3	Recruit'g Committee's Appeal	Wove Ct'ge	45½	$\frac{4}{1000}$	29	29	Chemical Wood 96 per cent. Ash (clay) 4 per cent.
4	Householder's Return	Wove Ct'ge	31½	$\frac{3\frac{1}{2}}{1000}$	20	27½	Chemical Wood 80 per cent. Cotton 16½ " " Ash (Clay) 3½ " "
5	His Majesty's Army Form B	White Print	23¼	$\frac{2\frac{1}{2}}{1000}$	7	54½	Chemical Wood 82 per cent. Ash (Clay) 18 per cent.

REMARKS:—No. 3, traces of Esparto and animal size present; No. 4, slightly tub sized.

Below is a specimen blank report sheet for individual tests. It might be mentioned that periodically all these tests are indexed and the average properties and composition recorded for guidance. In some mills youths and young women carry out the testing of paper and dyestuffs after being duly trained either in Technical School or in the mill laboratory.

Ref. No. ________ ________ 191_
Sample from ________________________
Description ________________________
Substance D. Crown 480 s.s. ___ lbs. Bulk ——— inch
1000
Bursting Strength Mullen ___ lbs. Absorbency %

Composition

Mineral Matter ________ per cent
Chemical Wood ________ per cent
Mechanical Wood ________ per cent
Esparto ________ per cent
Size and Starch present ________
Remarks ________

NEW LINES FOR CANADA.

The Lincoln Paper Mills Co., Merritton, Ont., have now placed upon the market their new lines in parchment or greaseproof and glassine papers which are being favorably received by the trade, the samples being well up to the mark. The necessary equipment was installed some months ago and experiments have been conducted for several weeks. The greaseproof paper was the first to make its appearance and this has been followed by glassine. Both lines are made in weights from 24 to 30 pounds and come in any size sheet or rolls in bleached, half bleached and unbleached. Greaseproof paper is largely used by meat packers, [illegible] packers and others while glassine is employed for in wrapping confectionery, bread and other lines as well as for window envelopes. These papers are the first of their kind to be manufactured in Canada and are turned out at the Lybster plant. The Lincoln Paper Mills Co. are also making [illegible] kraft of the weight of 25 pounds. This is another new line with them which is developing well.

THE GREAT CHINA CLAY DEPOSITS OF CORNWALL, ENGLAND

By ARTHUR LAKES.

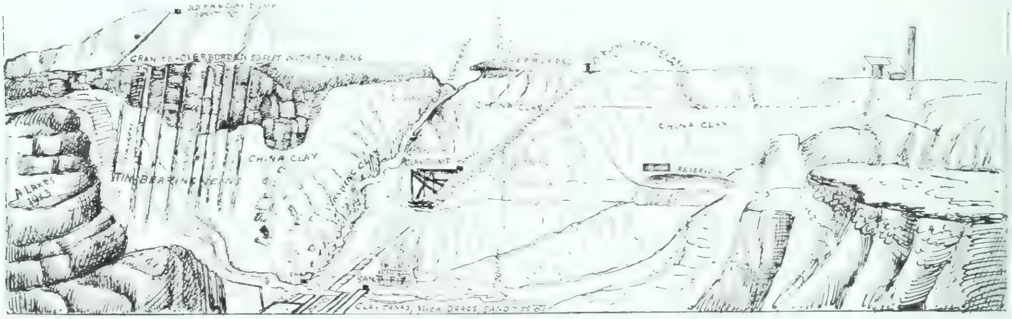
On my first visit to these celebrated deposits at St. Austell some thirty years ago development was in its infancy. The evidences of prospecting work then in progress were milky streams issuing from the granite hills and whitening the waters of the rivers. Since then the china clay industry of Cornwall has grown to be the greatest and most celebrated of its kind.

On leaving the quaint little town of St. Austell we were at once in the heart of the china clay field. On either side of the valleys, and on the hills and surrounding country as far as the eye can reach, are enormous gray dumps representing the worthless debris thrown out in developing the clay from great crater-like pits of "gloryholes" two or three hundred yards in diameter and several hundred ft. in depth. The scene reminded one of pictures of the surface of the moon with its multitudinous craters and mounds.

The existence of the clay has been known for over 100 years, but the industry dates over the past 50 years. The clay is derived from the decomposition of granite.

Although from 20 to 300 ft. is the average available depth reached in the pits, this by no means represents the full depth of the clay deposits. Borings have been put down 500 ft. or more without bottoming it. In some quarries a series of closely parallel tin-bearing lodes outcrop and cut down through the clay measures. It is significant of the origin and decomposition of the clays that the principal clay zones run parallel with the principal tin veins of the country. Heated solutions and gases that were connected with the formation of the tin veins, rising from great depths through fissures, doubtless decomposed the rocks adjacent to the veins and formed the china clay. Fluorspar and tourmaline minerals originating through the agency of fluorine and boracic gases, found common to both tin veins and china clay, point to the same origin for both.

In some of these quarries, clay was being broken up and washed down into "sand pits" or "Micas" where after a process of purification, it was pumped to the surface by Cornish pumps which also drained the pits.



Ancient Carclase Tin Mine, now a Clay Pit. "Overburden" is Granite. Tin veins traverse both clay and the overlooking granite.

Along our road we passed several clay tanks under large sheds called "drys", and open tanks where the milky streams from the quarries and hills are allowed to settle and the impurities are removed. The clay when sufficiently dried and consistent is cut up in blocks, shovelled onto railroad cars and transported by special steamers over the world from sea ports in the vicinity.

Towards the eastern outskirts of the district were a great number of huge clay pits. Some of these quarries are worked for china-clay only, others for what is called "China Stone" or "Cornish Stone" a partially altered granite, composed mainly of quartz and feldspar. This rock is ground under millstones and the ground-up material of quartz and feldspar, resembling commercial salt, is shipped without washing. It is used exclusively for the manufacture of chinaware. Near the bottom of some of these pits was a zone of china stone stained purple by fluorspar. This "purple-rock" is in great demand for china manufacture.

After examining the eastern section of the field in the neighborhood of Trevistock, we drove to Henbarrow district, typical of the western division. This region is the highest in Cornwall, attaining an altitude of upwards of 1,000 ft. above sea level. It consists of rolling hills and moors dotted over with clay dumps and pits, with rivulets of milk-white water pouring down into the river below.

Typical of the clay-pits is the "Carclase mine" which was worked by the Carthaginians and Phoenicians as a tin mine whilst to-day it is developed for clay alone. A number of tin leads and quartz veins appear in parallel courses on the sides of the pit, cutting through the granite "overburden" down into the clay beds beneath.

Near the bottom men were breaking down the clay with broad-bladed mattocks called "Dubbies". The workers are aided by water-falls from a flume above. The broken-up and partially dissolved clay is washed down into a "Sand pit" where the quartz of the granite is separated by precipitation. Thence the partially purified clay passes on into long vats called "Micas" or "Mica-drags" where the mica is precipi-

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In The Canadian Mining Journal.

tated and got rid of, leaving the clay nearly pure. The purified material in some cases passes down into a pit or shaft below the bottom of the workings as at Carclase, thence through a tunnel in the hill to the neighboring village or else is pumped direct to the surface by Cornish pumps and descends by gravity through earthenware pipes to the same place. There it settles in large open, as well as covered, tanks or "Drys" till it has attained sufficient consistency to admit of being broken up and shovelled on the railway cars and taken to the nearest sea ports.

Shipping China Clay, Fowey, Eng.

Analysis and uses of china clay.—China clay is a hydrated silicilate of alumina.

An average analysis gives:

	Per cent.
Silica	46.32
Alumina	40.27
Magnesia	.44
Carbonate of Lime	.36
Water	12.67
Loss	.20
	100.00

In its natural state the clay is plastic and gritty, the latter due to grains of quartz.

About 60,000 tons of china stone is annually produced. The output of china clay in 18[illegible] [illegible] years after its discovery, was 1,400 tons and in 1908 721,316 tons. At the present it approaches 1,000,000 tons.

There has been great increase in the industry within the past few years. New lands are still being taken up and new clay pits opened. This industry has far outstripped in value and importance the time-honored industries for which Cornwall was formerly noted, such as the mining of tin, copper and lead.

The chief shipping ports in Cornwall are at Fowey and Charleston, by special steamers, carrying each from four to five thousand tons to America and various other parts of the world. The clay is shipped in bulk or in barrels, each barrel holding 1,000 lbs. of clay.

Origin of the Cornish china stone and china clay.—These remarkable deposits are derived from the subterranean decomposition of the native granite on a vast scale. This decomposition was not due as might have been supposed to surface waters percolating downwards from above, but from heated waters and gases ascending from below. This is clearly shown in many of the pits where a heavy overburden of hard massive or partially altered granite has to be passed through to reach the underlying clay.

Origin of China Clay.

At an early period, heated magmatic waters and gases arose from great depths into the granite and, whilst filling its cleavage cracks and fault-fissures with solutions of tin and silica decomposed the surrounding granite on a vast scale and to an unknown but great depth. By elimination of the alkalies and silica of the feldspars, partially altered and completely decomposed granite resulted, the one in china stone the other clay or kaolin.

The history of china clay and the Cornish deposits.—"Kaolin," the technical name for china clay, is from "Kaolong" or "Kauling" a hill near King-tibichin in China, where the clay was first discovered and worked. Kauling means a lofty hill or ridge. The clay from this locality was first sent to Europe by a Jesuit Missionary in the early part of the 18th century. A similar white clay was later found at Aue near Schneeberg in Saxony and used in the manufacture of porcelain, laying the foundation of the celebrated Dresden-ware. It was also found near Limoges, France. In England kaolin was discovered in Cornwall in 1755 and "hard-paste" china was manufactured at Plymouth and Bristol in 1760.

The Chinese used the clay for domestic ware. The process was kept secret, till revealed by Jesuits. China gave the name to the clay. The word "Clay" is from the German "Klei" meaning to stick. Porcelain is an Italian word. Porcelain was unknown in England until specimens were brought from China. The possibilities of British deposits were long unknown and unrecognized. The first efforts in porcelain manufacture were from imported clay and not until Wedgwood's day were the natural china clay resources of Cornwall appreciated or used. Porcelain was called "China" in India and the East. It was also known as "Chiny," "Cheney" and "Chaney."

Mica Drags, North Rose Co., Cornwall, Eng.

The discovery that the ingredients used by the Chinese existed in Cornwall was by a famed Quaker

William Cooksworthy in 1755. Being interested in the manufacture of porcelain he experimented with the stone of Cornwall and Devon and established a pottery at Plymouth in 1760.

During the fifteenth and sixteenth centuries china porcelain found its way into Europe. The Florentines copied the Chinese. The Jesuit, Father Entrecolles, introduced china clay into Europe in the eighteenth century.

Shipping China Clay, Fowey, Eng.

China clays have been discovered in Pennsylvania and North Carolina, in Saxony, Bohemia, France, Russia and Sweden, usually derived from decomposition of granite, but sometimes simply from that of Cretaceous strata. The better qualities of Cornish-clay are unequalled elsewhere.

Kaolin gives plasticity to the china paste and secures retention of form for the ware in the kiln. Petunzite or china stone gives translucent qualities to porcelain.

Uses of china clay.—Besides for porcelain, it is principally used in paper-making, rendering the paper smooth and opaque; it is readily incorporated in the fibre and adheres closely to it. It is also used in cotton-sizing and bleaching, in alum-cake, linoleum, floorcloth, ultramarine, asbestos-rubber, soap, oil, paint and chemicals. The main use of china stone is in strengthening the body of porcelain and glazing.

Modes of development and working of china clay mines.—The first thing to determine in new china clay property is whether there is sufficient depth and area of clay to be worth working. This is proven by boring and by trial pits. A shaft, called a "washing-shaft" is then sunk in the centre of the clay area and to the bottom. Another called the "engine shaft" is sunk on the edge of the deposit to accommodate a Cornish pump. A tunnel is driven connecting the bottom of both shafts. The overburden, which may be from 10 to 50 ft. thick or more of "meat" earth "Killas" or granite is then removed from around the top of the "washing shaft" by tram-waggons. Water is brought in at different points to wash down the uncovered clay until the deposit is exhausted.

For washing, water is brought by wooden conduits or launders. Before turning on the stream a portion of the exposed bed is broken up by "dubbies" or large broad bladed mattocks. The tracks caused by this breaking up is called a "Streak". A stream of great force is let down over the area of the streak. Water separates the clay and mica from the sand and stones. At the bottom of the pit quartz sand is caught in framed pits called sand pits or drags. Some clay or mica continues its course over the drags until the washing shaft is reached, down which it flows and thence through the connecting level into the bottom of the pumping shaft. Running water holds the clay and mica in suspension. The coarser grains of quartz are deposited in the drags at the bottom of the mine. Lighter particles of clay pass on in a milky stream into the washing shaft. The clay in suspension is pumped up from the bottom of the pumping shaft to the surface and carried by earthen pipes to the entrance of the micas which occupy a series of parallel channels. These mica drags, usually about 200 feet long, 2 feet deep and divided lengthwise, bring about total separation of the clay from the mica in suspension. Fluid clay comes out of the pipe running from the works and, entering the micas from the top end, is distributed over the whole area. The stream at the end of its course passes through copper gauze mesh 3,000 holes to the inch. Mica extracted by gravitation is used for coarse goods.

Clay tarnished by mica is of inferior quality. Sometimes when the clay it opened on the top of a steep hill it is not pumped up from the bottom of the pit, but comes up on the hillside through a tunnel from the pit bottom, the clay running in the "mica" at the lower level. The common 'Cornish-engine' pump of Bolton and Watt type of a century ago is used to a depth of 300 ft. Electric power is now being introduced in some of the mines.

The drys.—These consist of open as well as covered tanks of rectangular shape. At Charleston harbor is a good example of receiving tanks and drys and also of the mode of shipping of special steamers. White clay pours down as a liquid from the hills above the port openly or through pipes into the receiving tanks. These are a series of large rectangular structures, 8 to 10 ft. deep and over 100 ft. long. In total length they are 280ft., which is the length of the adjacent shed covering the dry tanks preparing for shipping.

Drying Clay, Cornwall, Eng.

In this shed the tanks are 18ft. wide, 5 to 6ft. deep, paved with broad fire-clay tiles resting on a series of flues traversing the dry from end to end, cross-wise. Heat is supplied from a furnace at the end of the building. The clay from the receiving tanks just above the drys passes into the latter in a liquid stream like cream and spreads out and accumulates on top of the tiles to a thickness of 6 or 8 ins. When this layer has by drying attained the consistency of cheese or butter, it is cut up in blocks and shovelled into the railway cars below the dry and thence it is taken to a steam boat. The water contained in the liquid clay of the upper or receiving tanks is let out by wooden plugs. The clay may be left to settle in the receiving tanks for four to six weeks. When the clay in the dry is sufficiently consistent, wagons are run onto a platform, movable along the entire length of the building, so the clay can be placed at any required spot. It is divided into blocks of a suitable size for lifting on a shovel and may be removed to a linhay or store-room to admit of the moisture being driven off more rapidly. Drying takes from one to three days. Too rapid heating of the flues takes the nature out of the clay. Dry clay from the linhay is either sent away in bulk or packed into sacks or barrels. From the time the china clay is washed to the time it is dried is about six to eight weeks.

In preparing this article the writer is indebted to the various china clay companies at St. Austell and particularly to the North & Rose Co., for illustrations and other data, also to Mr. W. Cune for guidance over the area and for much scientific and geological information.

FORESTRY AND PAPER MAKING

By THOMAS J. KEENAN, F.C.S.

It may argue the possession of a considerable amount of assurance for one interested in the utilization of woods in paper-making to set before scientific foresters and students of forestry any account of the processes involved in the destruction of trees. It would certainly have been a venturesome thing to do a decade ago, before reforestation, and foresters themselves had realized the service they could render a great industry by establishing rules for cutting and replanting.

Conservation of Timberlands by Papermakers.

As the consumption of wood in the manufacture of paper is about three times in excess of its natural rate of production, the paper industry is confronted with an impending scarcity of material, and efforts are being made by reforestation and tree culture to save the industry. The great and prosperous corporations engaged in the manufacture of pulp and paper are looking for relief to foresters trained in schools like the New York State College of Forestry, who are able to put into practice the principles of conservation and reproduction of timber, which they have studied under able masters.

The tendency is increasing among the really important producers of pulp and paper to treat timber tracts as the agriculturist does his cereal crops, the harvesting being carefully regulated, the care of young and growing plants with regard to light and shade studied, and the subsequent planting of cut-over areas carefully observed. Experience has taught them that spruce and pine should be grown the same as any other crop. In the St. Maurice Valley, Quebec, where the Laurentide Company has control of some 2,500 square miles of timberlands, comprising some of the most accessible pulpwood in the Dominion of Canada and a supply that would seem to be of endless duration, it is estimated that it will be all cut, at the present rate of consumption, within a period of between fifty and seventy-five years. Hence the necessity of replanting yearly as a provision for the future.

Forestry Policy of the West Virginia Pulp and Paper Company.

I may be permitted to instance the policy and practice of the West Virginia Pulp and Paper Company, which owns, operates and cultivates large boundaries of spruce timber lands in the State of West Virginia, the great portion of which is being utilized in the manufacture of paper.

This company began cutting at one edge of the boundary about fifteen years ago, and has ever since conducted its operations upon the most approved scientific plan for timber conservation. All the young trees which are not more than ten inches in diameter at the stump are left standing. In addition to that, the native growth of seedlings, which are found in great abundance in many places, are in the spring of the year distributed. In this way, the barren spots are planted, and the dense growth thinned out to good purpose.

The principal thing to which the company devotes its attention is the protection of the forest against fires; for when that is done, the work of reproduction is well cared for by nature; all the trees want is a chance for their life. In operating their timber limits the company clears the right of way along the line of its logging roads for a distance of 100 feet on each side of the track; thus minimizing the chance of fire being started by sparks from the locomotives. The entire boundary is constantly patrolled during those seasons when fire would burn in the timber, and every possible precaution taken to prevent the flames from starting.

Every crew working in the woods or on the railroad is organized as a fire-fighting company, with instructions to quit all other work immediately and proceed to the stamping out of any fire that may be reported. The result is that within the last fifteen years the acreage burned over has been quite insignificant, and the young trees thus protected have made such rapid growth that where the operations first began pulpwood could now be taken in quantities that would compare favorably with much of the Canadian territory.

Such, however, is the extent of the holdings of this company that no second cutting will take place probably for the next fifteen or twenty years, at the end of which time there will be a new forest ready for the harvest. The trees will not be so large, of course, as many of the trees of the original growth, but it will be a young and vigorous growth that will many times repay the owners for the care taken in its production.

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*A lecture delivered before the New York State College of Forestry at Syracuse University, March 18, 1915.

By a continuance of this method, which, though apparently expensive, is nevertheless exceedingly satisfactory, it will be readily seen that the paper mills dependent upon this source of supply may be continuously operated for an indefinite period of time.

The Tree is Preferred Material.

There is a great abundance of fibrous plants suitable for papermaking, but the cheapest and best available material is wood. Those who have advocated the use of other plants, such as the milkweed, asparagus, sugar cane, rice, flax, etc., have not always considered the obstacles inherent thereto. The enormous quantity required, and the labor to collect and convert them into serviceable papermaking material, not to speak of their low yield of fibre—the highest being 35 per cent, and the average 15 per cent—are factors adverse to their commercial employment. Again, some cannot be profitably bleached and others lose so much in preparation that they cease to be economical. In the present state of our knowledge it may be confidently asserted that no other fibrous plant can replace the tree as a source of cheap paper.

Woods Used in Papermaking.

Although it has been demonstrated in the laboratories of the United States Forest Service that newsprint can be made from upwards of twenty different woods in addition to spruce, in commercial work the substitutes for spruce are confined to balsam, fir, jack pine and hemlock, used alone or in admixture with spruce, none, however, in any great quantity, except perhaps balsam, which is used freely; some mills, indeed, making no distinction between spruce and balsam and using both as they are cut.

It is now generally recognized in the paper industry that with improved methods of grinding, the use of duller stones, and lighter pressure, balsam could be substituted wholly for spruce; while jack pine enters largely into the manufacture of pulp for newsprint, where it can be obtained locally. Where spruce was formerly used altogether in the sulphite process, it is being displaced to some extent by hemlock and jack pine, and some serviceable newsprint paper has been made from combinations of different ground wood pulps, mixed with about one-quarter of their combined weight of quick-cooked sulphite hemlock; tamarack has also been used of late to a limited extent in the manufacture of chemical pulp by the sulphite process.

The Two Chief Processes of Pulp Manufacture.

Trees are converted into pulp and paper by two main processes involving several subdivisions. The pulp may be produced by the simple process of pressing pieces of wood against a revolving grindstone under a stream of water so as to tear the fibres apart, this constituting ground wood or mechanical pulp; or the wood may be boiled with chemicals under pressure until the fibres are set free from their enveloping bodies, juices, resins, gums, etc., to reveal chemical pulp or cellulose, which is named according to the chemical process employed, either sulphite, soda or sulphate pulp.

Although chemically prepared pulp forms part of the body of newsprint paper, it is in the manufacture of this variety of paper that wood is directly consumed without the intervention of chemicals. The finer grades of writing, book and magazine papers consist wholly of chemical pulp, which is produced either from rags or wood, but mostly they are of mixed sulphite and soda pulps of wood.

Ordinary newsprint paper is not endowed with long life, its large content of ground wood being responsible for its perishable nature. The fibres stripped from the tree in the grinding process carry with them the sap, resin and lignin of the wood, and these undergo oxidation and discoloration in contact with the air, so that the sheet rapidly becomes brown and brittle and finally crumbles to decay. All papers made from mixtures of ground wood and chemical pulps are lasting, according to the amount of either one of these pulps present, the ground wood being the element of weakness.

From the Tree to the Web of Paper.

As a point of departure for a view of the process of paper making nothing, perhaps, will serve so well as a piece of ordinary newsprint paper.

Roughly speaking, newsprint stock is composed of about seventy-five parts of tree substance torn from the peeled stem by a revolving grindstone under water; twenty-five parts of chemical pulp produced by boiling the wood under pressure in a solution of lime and sulphur, so as to set free the fibres by dissolving the substances that united them; five to ten parts of white clay (kaolin), washed and sieved many times to make it fine enough to cost the micrsocopic fibres of the wood, fill up the spaces between them, and so impart weight and an even surface to the paper; two to five parts of rosin, distributed in alkaline solution among the mixed fibres in the early stages of manufacture, and afterwards precipitated on the fibres by alum, give the finished paper a surface resistance to the absorption of ink; then, there is added a varying but minute proportion of mixed dyestuffs to overcome the yellowish color of the raw wood pulp.

The ideal location for a pulp and paper mill is a well wooded region, broken up with watercourses for carrying the logs and providing power for the operation of the mills. In such a plant the logs are drawn from the river or sluice to the slasher or gangways, where they are cut in lengths, varying from two to four feet each, according to the form of grinder used subsequently. The short logs pass on from the slasher to the barker room, where they are peeled before being deposited in the grinders. The grinders in use are of two kinds, one a pocket grinder, which accommodates three or four 2-foot sticks of wood, and the other a magazine grinder, of German invention, which can be charged with twelve cords of wood at a time, the sticks being of full-cord size 4-feet long.

Under a stream of water the pulpy fibres are torn from the wood, pressed lengthwise against the grindstone in such a way as not to divide the fibres but to preserve them as much as possible in their greatest length. It is inevitable, however, that the fibres should break in grinding and be more or less macerated in the process, all of which adds to the weakness of the groundwood.

The soft pulpy mass, diluted by the stream of water directed against the grindstone, flows by gravity to a screening apparatus where the slivers and splinters are caught. The liquid pulp undergoes a number of other screening, straining, and dehydrating processes before it is allowed to flow by gravity to the slush tank, from which it is afterwards pumped to the wet machines for conversion into laps for storage, or is ready for the beating engine in the beater room of the paper mill.

A Modern Development.

The ideal location for a pulp and paper mill has been described. A few years ago it would have been deemed almost impossible to operate a paper mill at any distance from the sources of supply of wood and water, but there have been some interesting developments in the industry during the past ten years. Water and steam are being displaced by electricity as motive power and it is now possible to manufacture paper in the heart of a great metropolis like New York. For a few years past a paper mill has been operated successfully on the South Brooklyn waterfront. The pulps and purchased readymade, the groundwood in Canada and the chemical pulp in Sweden, and delivered at the dock of the mill in large bales. Here the pulp is shredded and diluted with water before being pumped to the mixing tubs and beating engines of the mill proper.

The Various Chemical Processes

The chemical pulp used in the manufacture of newsprint paper is called sulphite cellulose in the trade, or "sulphite" for short. It is made by boiling chipped spruce or hemlock wood under pressure in a liquid formed by passing the vapors or burning sulphur through milk of lime well diluted with water in tanks, or by drawing the cooled gas through towers in which limestone is placed and down which water trickles, which absorbs the sulphur gas and in contact with the lime yields bisulphite of lime liquor, the active solvent agent.

The chief process for the conversion of wood into paper pulp means of chemical solutions are known as the **sulphite,** the **soda**, and the **sulphate.** In the sulphite process about fifty per cent of the total weight of the wood is recovered as cellulose fibre; the yield is less in the soda process, which is only adapted for soft woods like poplar, bass, and cottonwood; while the sulphate process, which is largely displacing the older soda process, gives a yield of fibre equal in amount to the sulphite process, and almost any kind of wood, sawmill waste, etc., can be reduced by it.

Treatment of Pulp in the Beater.

It is an old axiom with papermakers that the paper is made in the beater. Here the groundwood receives its admixture of sulphite pulp and the coloring matter, clay rosin, and alum, which go to make up the body of newsprint paper. After the addition of the required proportion of sulphite pulp, and a carefully measured quantity of blue and red dyestuff to correct the yellow tone of the groundwood, the clay is added, followed by rosin sizing (made by emulsifying rosin with soda ash) and a quantity of alum sufficient to precipitate the rosin throughout the fibres, where it serves to make the finished paper partly resistant to the absorption of ink. Some newsprint paper is not sized at all, and all are but lightly sized, in the beater with rosin bonds, ledgers, etc., which are doubly sized in the beater with rosin.

The beating engine in which the mixed pulps, loading material, and sizing are assembled is the modern analogue of the stamping machine or crude mortar and pestle of the medieval craftsman. The mixed ingredients are circulated in the beater for a varying length of time, any lumps or agglutinated fibres being smoothed or teased out as the mass of pulp passes under a revolving roll or drum fitted with thick knife edges which touch more or less heavily in passing on a stationary bedplate equipped with upright blades corresponding to those on the roll.

Formation of Paper on the Fourdrinier.

From the beater, the pulp, now called wholestuff, descends through an opening in the bottom of the tub to the stuff chest, where it is copiously diluted with water under constant agitation. It is then pumped through a system of pipes to a jordan or refining engine and over and under many screens and strainers of different sizes and makes until it passes, a thin milky fluid, from the flow box at the head of the fourdrinier machine, past the slices which regulates its descent, on to the swiftly travelling, endless sheet of copper gauze called the fourdrinier wire, which in addition to a forward motion, at the rate of 600 to 750 feet a minute, has a regular sidewise reciprocating shaking motion with a frequency sometimes of three hundred shakes a minute. The diffused mass of pulp and loading material as it falls on the running wire is diluted so that only about one pound of stock is contained in from 150 to 250 pounds of water.

Arrangement of the Fibres in the Sheet.

The reason a thin issue, such as ordinary newsprint paper, is able to withstand the great strain it does when turning about the angle bars of a high-speed printing press is to be found in the arrangement of the fibres in the sheet during its formation on the papermaking machine.

The forward motion imparted to the stock on the moving wire of the fourdrinier machine arranges the fibres in long lines, more or less interlaced, but their length generally tending in a given direction that is, in the direction in which the stock in traveling. The sheet accordingly possesses both a grain and a cross grain, much the same as the original wood.

It will thus be understood how, by means of the rapid forward motion and the reciprocating sidewise motion, already mentioned, the manufacturer is enabled to produce a sheet that may be drawn around the rapidly revolving cylinders of high-speed presses and that will safely turn about the angle bars, where it is subjected to its greatest strain.

As the excess of water drains away through the perforations in the moving band of copper gauze, a thin film begins to form, and by the time the wire approaches the couch roll, where it reverses, the delicate tissue of paper in the formative stage is barely discernible, reminding one of the appearance of ice as it begins to form in a shallow pool. The gauzelike web of interlacing fibres is transferred automatically from the running wire to the first felt and couch roll by a special piece of mechanism of great delicacy of operation, as the clumsy touch of a man's hand would be fatal to its continuity.

The subsequent management of the sheet in its journey over and under the drying rolls until it is calendered, reeled, and cut, calls for the exercise of much watchful care and skill on the part of the machine tenders who are responsible operatives in a paper mill and command good pay.

WEST LOOKS GOOD.

Wm. Hobson, representing Andrew Whyte and Sons, Edinburgh, Scotland, was in Toronto and Montreal this week on his return from an extended business trip throughout the Canadian west. He reports that, while business is quiet, there is gradual improvement in the West, and a decided change is looked for if the crops turn out as well as they promise at the present time.

WHO'S WHO IN THE CANADIAN PULP AND PAPER INDUSTRY

H. B. HART

Managing Director, British American Wax Paper Company, Limited

Orators wax eloquent, moons wax and wane and likewise the tides. Shoemaker's threads are waxed and so are the floors of dance halls, but the waxed commodity, with which the subject of this reference is prominently identified, is Paper. The extended and varied use of waxed paper in Canada today is synonmous with the name of Mr. Henry Burcham Hart, the aggressive managing director of the British American Wax Paper Co., Limited of Toronto, which city may fairly be classed the "Sheffield" of the industry in the Dominion.

To have attained its present importance and to have acquired so large a connection of patrons, whose diversified demands, aggregate hundreds of tons annually, implies of the part of the builder-knowledge, skill, tact and courtesy. These attributes characterize Mr. Hart and contribute to the esteem in which he is held by the long list of customers of the British American Wax Paper Co., which include many leading manufacturers and prosperous business men from Halifax to Vancouver. But these personal qualities alone would not avail unless supported by a product of established and widely recognized merit.

The grade and range of papers and wax and the splendid equipment in the shape of numerous waxing, printing, cutting and slitting machines possessed by the firm, efficiently supply the requirements of the trade. The extensive space occupied in the Darling Building on Spadina Avenue, when contrasted with that used only four years ago, is concrete evidence of the Company's exceptional growth and solidity. Constant expansion, due in no inconsiderable measure to the many new uses of waxed paper has compelled the organization to secure larger and more commodious premises. An entire floor and basement in the building of the Wrigley Chewing Gum Co., now in process of construction on Carlaw Avenue, Toronto, will, in a few months be the new home of the British American Wax Paper Co. The immense structure is 260 feet long and 80 wide, and the firm will have a total space of 30,000 square feet. This will enable it to install the very latest machines and provide the most modern facilities for the rapid discharge of the several operatons involved in the successful manufacture of waxed paper.

Up to a comparatively recent date, waxed paper was only in its infancy, but it now caters to the baker, the confectioner, the druggist, the meat packer, the florist, the tobacconist, the cigar maker, the coach manufacturer, the producers of electric and leather goods, as well as butter, lard and cheese merchants. Its use will soon become as indispensible as the telephone, the train and the telegraph. Being water, germ and dust proof, waxed paper fulfills the first and most essential demands of hygienics—the preservation of health, and may well be regarded as one of the strongest adjuncts of the "Safety First" movement in the matter of cleanliness and sanitation. It is interesting to note the many tons of paper ranging from light weight tissues to heavy manillas, including sulphite, book, etc., which are consumed annually by the company in catering to the requirements of hundreds of customers some of whom employ a miniature printed waxed wrapper, $2\frac{1}{2} \times 3\frac{1}{4}$ inches, while others use a size, 25 x 36 inches. Even a larger sheet can be made. The British American Wax Paper Co. supplies all these needs and its volume of business has each year shown a very gratifying increase.

Mr. Hart was born in London, England in 1881 and, after completing his education, began his business career with the London County Banking Corporation on Lombard Street in the world's metropolis. After five years of financial training, he decided to come to Canada—the young man's country—believing that it offered a wider field for his energies and activity. Arriving in Toronto ten years ago, his first position was with Rolph and Clark, lithographers and engravers, with whom he remained a couple of years. In May, 1907, Mr. S. M. Ramsey took out letters patent for the British American Wax Paper Co. and in a few months machinery and stock were installed in the Truth

Building, 75 Adelaide Street West. Meeting Mr. Ramsey one morning the latter offered Mr. Hart a place in the office of the new concern, which he accepted. Later the subject of this reference tried his hand at the selling game, and it was not an unusual experience in those days for him to secure an order for paper, wax, print and cut it by his own efforts and even deliver the goods. In building up an expanding business the whole of one's time, talent and attention has to be devoted to the object in view, and so successful was the result of Mr. Hart's endeavors that he was promoted step by step to his present responsible post of managing director of the company. His chief hobby is the development of the waxed paper industry and in this sphere his work and worth are widely known. A member of the Canadian Manufacturer's Association, the Toronto Board of Trade and the Rotary Club, by his geniality, intergity and business ability, Mr. Hart has created, both for himself and his firm, a well merited and broadly established connection.

REPRESENTATIONS OF PULP AND PAPER ASSOCIATION BEFORE BOARD OF RAILWAY COMMISSIONERS

The following is a condensed report of the remarks of Mr. A. D. Huff, representing the Canadian Pulp and Paper Association before the Board of Railway Commissioners at Ottawa, April 14th and 15th.

I propose to discuss the items 102 and 153 Paper from the standpoint of the effect which the proposed increases would have upon the pulp and paper industry. I have not had any reason to change the opinion I expressed at the first hearing before the Board, and as a matter of fact, the more I go into the question the more I am convinced that the whole proposition is from our point of view, at least, wrong, and that if the railroads themselves had analyzed the figures as submitted to this Board, I feel satisfied that they would not have included these items in their application, but would have felt themselves that the rates are already unreasonable and should not stand any increase.

I think that there is a misapprehension abroad, particularly on the part of the railroads in regard to the pulp and paper industry, as a result, I suspect, of the conspicuous success of one individual concern. Paper and pulp mills have sprung up in the last few years like mushrooms, and everybody seems to think that paper and pulp mills are gold mines. The industry has grown until to-day it represents in Canada an investent of over $100,000,000, paying about $10,000,000 a year in wages and with a total of about 50,000 people dependent upon it. This statement is based on actual returns from 30 mills representing 62 per cent of the mills east of Port Arthur and the figures are drawn up on the basis of capacity. Unfortunately the growth of pulp and paper mills has been very much like that of the railroads—far in excess of public requirements, and the situation in that respect is very similar to the present situation of the railways. The obvious result is that production is in excess of consumption. There is a surplus to-day in both the United States and Canada of paper and pulp. Great quantities of imported pulp are now being stored in Eastern United States ports.

There is no basis to the argument that the pulp and paper manufacturer can increase the price of his product proportionately with the increased cost of materials. Paper prices in Canada have decreased steadily since [illegible]. In 1912 paper was being sold by the Canadian mills in Central Freight Association territory at [illegible] per hundred. In 1913 it dropped to [illegible], in 1914 to [illegible], in 1915 to [illegible]. This condition also obtains in regard to pulp of both kinds, while costs of material of labor have been steadily increasing. The law of supply and demand is just as effective as ever it was and we cannot get the price up to anything like what it should be.

I fully expect that after the war is over and shipping conditions become normal, there will be an immense quantity of Scandinavian and other European wood pulp released that will further depress the market. If more pulp from Europe is piled in on the United States, which is the large market of the Canadian mills, it is going to seriously curtail, if not actually shut down, that market, and with the enormous new tonnage produced in the last five or six years, something has got to smash.

Mr. Huff then filed a table of comparative freights including the following conspicuous examples showing the disadvantage under which the Canadian mills are working:

From To	Distance.	Rate Cents.	Revenue ton mile, Mills.
Millinocket, Me.—Chicago.. ..	1182	18.9	3.2
Berlin, N.H.—Detroit	[illegible]	16.4	4.3
Ottawa, Ont.—[illegible]	[illegible]	14.5	10.1
Windsor Mills, Que.—Windsor.	641	24	7.5

I understand that there is not a single mill in Canada that did not operate at a loss for a period of years before it began to show any profit at all, and some of these mills have never reached that point and probably never will. Those that have attained success have done so only through consistent and persistent improvement in equipment and efficiency.

We feel that pulp and paper and in fact every heavy commodity that goes into the products of our mills are more remunerative and profitable to the railways than any class of traffic that could be considered as at all analogous. We assist the railways by loading a car very heavily, since we understand that the greater weight they carry per car the less expense it means in the handling per ton. I do not think there is any other manufactured commodity in the country that has gone so far in assisting that problem for the railways. [illegible] in loading and unloading [illegible] there is very little expense to the railways in the handling of pulpwood and wood pulp.

Mr. Huff then filed a statement showing comparisons of relative railroad revenue in Official Classification and Canadian territory on the principal commodities involved.)

Official Classification Territory.

	Av'ge. Haul. Miles.	Av'ge Net Revenue. Per Car Mile. Cents.	Av'ge Net Revenue. Per Ton Mile. Mills.
Paper..	181	9	3.66
Wood pulp	151	9	2.77
Pulpwood	90	13	5.37

Canadian Territory.

Paper..	340	16.5	7.45
Wood pulp	129	27.5	10
Pulpwood.	90	28.3	9.4

The estimated amount in freight charges for 64 mills east of Port Arthur as the result of the 5 per cent. increase on international and export rates aggregates $138,585. If the application of the Canadian roads is granted it will mean to these same mills, according to our estimates, an additional charge of $200,920.

I might suggest while on this point, that the roads in the United States are filing tariffs on the 27th of this month which will bring about further advances from New England to Chicago and the West, in some cases as high as 12 per cent. on top of the 5 per cent. increase that went into effect on the 15th of January. If these advances are granted by the Interstate Commerce Commission they will automatically apply from the Eastern Canadian mills the same as the 5 per cent. advance, and so far as this industry is concerned I think it is only fair to ask that judgment be suspended on these items until we know the result of the effort of the American roads to further increase the rates from both New England and Canada. We not only want to see how much more it is going to cost us, but how much more the railways are going to benefit by it. They are already benefiting to a great extent under the 5 per cent. advance and will benefit to a greater extent if this additional increase is granted.

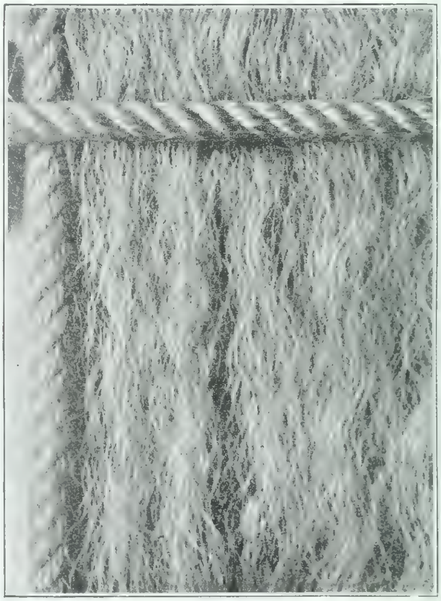
We quite appreciate that conditions are abnormal for the railroads as for everybody else. We feel the effects of it. This industry as a whole to-day I think is less able to assume additional burdens than the railroads themselves, taking the industry as a whole. Here we have an example of one large mill advertising the country by making a request to foreign bondholders to waive their interest on its bonds for seven years in order to give it a chance to get on its feet. We do not want to crowd any other mills into such an embarrassing position as that. We are assuming our share of the burdens imposed as a result of the war in the way of extra taxation, which is quite an item with all of us, and we do not feel that we should be asked to stand a share of anybody else's burden, particularly by the method proposed, when we feel very strongly that the existing basis of rates is already too high, commensurate with our share of the maintenance of transportation, having regard to the volume and value of our traffic. We certainly cannot agree to any increase under the circumstances, and as soon as conditions in the country have resumed anything like their normal character we will in all probability have to put in an application to the Board for a readjustment of our Canadian rates on a more equitable basis.

Esparto Grass for Manufacture of Paper

R. I. GEARE, in "The Paper Trade Journal."

Esparto grass, botanically known as "Stipa tenacissima," and commonly called "Alfa" by the Arabs in Algeria, is very abundant in the Barbary States. It was at one time used only for making baskets, mats, ropes, cord, etc., but since 1861 it has been employed in the manufacture of paper. At that time it was introduced into England with a patented process of treatment, and there is now hardly a paper mill in the United Kingdom where esparto is not used.

In the process of treatment at the mills esparto does not require cutting, but is subjected to four to six hours of active boiling in lye, so as to decompose the resinous substances and coloring matter in the grass. The fibre is then taken to the washing and bleaching machines where it is rapidly converted into stock (called "half stuff) ready for the beater or pulping engines for reduction to paper pulp. The later processes are similar to those employed for rags, with the exception that in the case of esparto there must be a very careful apportioning of the chemical ingredients used in order to bring about successful results. In compounding the lyes used with esparto, the quantity of soda is proportioned by actual weight to the quantity of grass to be treated, 9 to 10 per cent of the former being employed. The soda is first tested, and its strength determined, and the proper amount is gradually added, in a large iron vessel called a "lye-pan," to water which is kept at a boiling temperature by a jet of steam. When the soda is dissolved there is added a quantity of quick, or caustic, lime slightly less than the amount needed to precipitate the carbonate



Esparto Fibre.

contained as impurity in the caustic soda. This is regarded as an important point, as the presence of free or caustic lime in the lyes would be injurious to the esparto, hardening the grass and rendering it difficult to obtain the necessary sub-division of the fibres in the "half stuff."

Special grades of caustic soda free from lime have been recently produced for the use of manufacturers of esparto paper. The employment of this purified soda cheapens the cost of production of esparto pulp, avoids pollution of streams by the refuse of the mills, and makes it possible for the paper manufacturer, by merely dissolving more caustic soda, to use lyes over and over again until they by such continuous use become supersaturated with coloring matter.

The boiling process may be conducted in any form of boiler that will admit of fresh surfaces being exposed. To insure this result either the fibre must be moved through the lye or the lye passed over and through the fibre. This is most conveniently done in a stationary circular boiler 8 to 10 feet in diameter, with a false bottom perforated with small holes. In the centre is a pipe, 6 to 8 inches in diameter, up to which boiling lye is forced by steam, admitted under the false bottom in a continuous stream that is deflected by a plate or "bonnet." The liquid is passed and repassed over the fibre previously packed in the pan until the boiling process is completed; when the lye is drawn off and the fibre rinsed with fresh water. Revolving pans are sometimes used, but these are costly to construct, require power to turn them and occupy considerable space.

Esparto Grass.

After being rinsed, the resulting fibres are transferred to a "washing engine," and they are opened out and reduced to "half stuff." Bleaching powder in solution is added, circulation being kept up until the desired color is obtained. Diluted oil of nitrol is added to promote the action of the bleaching salts, or the same result may be attained by introducing a jet of steam into the engines and warming the contents. The resulting bleached "half stuff," or stock is thereupon drained in any convenient manner and is then ready to be transferred to the beater, or pulping-engine. The pulp may be run through a paper machine to produce the finished sheet of paper, or the esparto stock may be blended in any desired proportion with rag pulp.

The quantity of bleaching salts required for esparto is far in excess of that employed for white rags, and much more soda is also needed for making the lyes.

As the seed is at present expensive and difficult to obtain in considerable quantities, it is a question whether the growing of esparto grass in the United States will be carried on in the near future. It thrives, however, where practically no other vegetation can exist, and successfully resists both excessive heat and drought. It is of a dull green color, but after being plucked it is spread out to dry in the sun when it gradually turns a bright yellow color.

ARBOUR DAY.

Arbour Day says a special bulletin from the Commission of Conservation is not observed in Canada to the extent which its importance warrants.

The people of Canada must ever keep in mind their dependence upon her forests. With large areas suitable only for forestry purposes, it is essential that the value of trees and their protection should be thoroughly impressed upon Canadians.

While Arbour Day is observed in the rural schools, and in some city schools, its recognition by the general public is not as general as it should be.

In the Province of Quebec, Arbour Day is celebrated to a limited extent in the schools. This is not sufficient, however. The observance of Arbour Day should be general. There is need in every part of Canada for the education and instruction which Arbour Day represents. The day should be observed as a public holiday, at a time most suited to the climatic conditions of the locality. Public recognition should be given to Arbour Day, and the planting and protection of shade trees, the preparation of flowers and vegetable gardens and the thorough cleaning up of homes and surroundings should be advocated as special duties for the day.

Arbour Day has its justification in the value of trees from whatever point of view they may be considered. Nothing contributes so much to nake the world a pleasant place to live in as trees. The true home feeling is not satisfied without the presence of the trees with their shade and shelter, their beauty of form and color, their blossom and fruit, their varying shades with the passing of the seasons, and their fullness of color in the autumn days. They also afford homes and shelter for our feathered friends—the birds—during their annual visits to us.

There is nothing which will add beauty and value to a home or the schoolhouse more than the presence of trees; there is likewise nothing which adds more to the comfort of the pedestrain than shade trees on the roadside. The way may be long and dusty, but under the cool shade of the trees relief is found.

It is to be hoped, therefore, that the celebration of Arbour Day will become more general; that the planting and care of trees and shrubs around schoolhouses, homes, public spaces and by roadsides may have the effect of developing a keener appreciation of the value and beauty of trees; and that in thus enlarging the field of Arbour Day activities, greater interest may be created in the protection of our Canadian forests from the reckless destruction by fire and the axe with which they are threatened.

FIRE-PROOFING PAPER.

A fire-proof paper composition (as patented by Mr. William J. Moeller) consists of the following ingredients combined in substantially the proportions stated, viz.: asbestos fibre, about 48 per cent; mineral wool, about 48 per cent; sizing, about 2 per cent; lime, about 2 per cent. The lime should be ground before using and the sizing may consist of starch. These ingredients are placed in a receptacle and thoroughly mixed with water. Any sand or other deleterious substance is then eliminated.

The asbestos fibres possess great strength and these commingled with the mineral wool in the proportions stated produce a fire-proof paper of the necessary strength, and at the same time enable the production of the article at a comparatively small cost, thus greatly reducing the expense of manufacture. The sizing is put in the composition to serve as a binder to hold the mixture together when in its wet state, and while being made, but its presence in the composition is not essential afterwards and while in use. It is not necessary that the sizing be fire-proof as the other ingredients in the mixture all hold together when subjected to fire even though the sizing be destroyed thereby. The lime which is fire-proof is used for the purpose of hardening the mixture and making it stiffer. The proportions used produce the desired product, giving sufficient and necessary strength and at the same time the desired cheapness in the production of the product.

A.P.P.A. PRAISES MAINE.

At a recent meeting of the American Paper and Pulp Association, held in its headquarters, New York City, the following resolutions were passed:

Whereas, in the paper and pulp industry there is an ever increasing demand for efficient and intelligent employees, and

Whereas, the paper and pulp industry is sufficiently exacting and distinctive as to demand special preparation of those anticipating to pursue work in the industry; therefore

Be it resolved, That the American Paper and Pulp Association

First: Hereby expresses its hearty appreciation of the work being done by the University of Maine Paper and Pulp school in the training of young men in the fundamentals of this industry and

Second: That this association recognizes the desirability of young men supplementing the technical training provided by a university course along paper and pulp lines with practical mill experience, and in this belief recommends that the members of the association give, when practicable, opportunity for mill experience to young men preparing themselves for work in our industry during their summer vacation period.

RELATION OF INK TO PAPER.

A general description of the composition, manufacture and properties of some of the common types of printing inks is contained in Circular No. 53 of the Bureau of Standards, which has just been issued.

According to the correspondent of the "Paper Trade Journal," the materials entering into the composition of printing inks are divided roughly into two classes, viz., oils and pigments. The first class includes linseed oil, rosin oil, the various semi-drying oils, gums (resins), rosin and soap. The second class includes the various pigments from which the inks derive their color, and to some extent their consistency and working qualities. A brief description of the preparation and properties of these materials is given. The subject of driers is treated in a separate chapter. Various formulas are given showing the approximate composition of some inks.

The manufacture of printing inks is described showing the method of preparing the oil varnish and pigments, the methods of mixing and grinding, etc.

The circular then takes up the question of the relation of ink to the paper. To obtain satisfactory results in printing, these two factors, ink and paper, must be carefully adjusted. It is well known that an ink which is satisfactory on one paper will not be so on another, all other conditions being constant. One phase of this relationship between ink and paper is the opacity of the ink, a subject of particular importance in the three and four color processes. Emphasis is laid on the necessity for the printer to select the proper grades of paper which will be suitable for his work.

The question as to what constitutes a good ink is often asked, and while this circular does not pretend to answer this directly, it gives the requirements and tests specified by the Government Printing Office, which show how one Government department is handling this problem.

The Bureau of Standards has issued a technologic paper on the subject of the analysis of printing inks, an abstract of which is included in the circular. The application of these tests and their relation to the practical tests under working conditions are given.

Owing to the importance of linseed oil in printing inks, a special chapter is devoted to the manufacture and properties of this oil.

A bibliography on inks, oils and pigments is included for the benefit of those who wish to make a deeper study of the subject than the general nature of the circular permits.

E. H. Wilkinson, of Toronto, who is well known to the paper trade, has recently taken over some of the agencies formerly handled by G. B. Legge, 155 King street east, who has enlisted with the Second Contingent and is now a member of the headquarters staff, Fourth Brigade, Canadian Field Artillery. The lines include coated papers and card board made by Smith and McLaurin, Cartside Mills, Millikenpark, Scotland, and rope and twine of John Todd and Son, Rutherglen, Scotland. Mr. Wilkinson also represents the Ashcroft Mfg. Co. of New York, makers of the Ashcroft paper tester and thickness gauge, which are recognized as standard throughout the trade and are used by the governments at Washington and Ottawa. He has also closed a favorable arrangement with the Spanish River Pulp and Paper Co. for handling some of their product in Toronto and vicinity and has opened new offices on the third floor of the Bell Telephone building, Toronto.

NEW PATENTS

AN IMPROVED APPARATUS FOR DRYING PAPER

Invention to Facilitate the Drying of a Web as it Passes Over the Rolls—Capable of Use in Connection with a Variety of Drying Devices—Illustrated by the Inventors, described in Paper Trade Journal.

An apparatus for drying paper has been perfected by Bernard R. Andrews, of Newton, Mass., and Carl J. Merrill, of Middlesex, Mass., who thus describe the invention:

This invention relates to drying apparatus which is especially adapted for use in drying or facilitating the drying of a web of material as it passes over a plurality of rolls, cylinders or other supporting members. While our invention is capable of use in connection with a variety of drying devices for drying a web as it thus passes over supporting members, yet we have herein chosen to illustrate it as it would be applied to an apparatus for drying a web of paper as it passes through a paper making machine. It will be understood, however, that the invention is not confined to use in drying paper and that the invention is shown herein as applied to a paper making machine for illustrative purposes only.

In the manufacture of paper it is customery to dry the web of paper as it comes from the squeeze rolls and before it is delivered to the calandering rolls by passing the paper web over a plurality of heated cylinders, said cylinders being frequently so arranged relative to each other that in passing over them the web forms a plurality of pocket-like spaces between adjacent rolls. The familiar way of arranging the rolls is to place them in two rows, one above the other and in staggered relation so that one series of pocket-like spaces is formed beneath the rolls of the upper set and between the adjacent rolls of the lower set, and another series of pocket-like spaces is formed above the rolls of the lower set and between the adjacent rolls of the upper set.

In the operation of a drying machine of this type the heat of the cylinders causes large volumes of steam to be driven off from the web of paper as it passes thereover, and to facilitate the drying operation it has been proposed to place nozzles in the various pockets from which drying blasts of air are delivered against the web forming the sides of the pocket, said blasts of air being produced from a suitable fan or blower.

A paper making machine is usually provided with a considerable number of drying cylinders, thus forming a corresponding number of pockets, and in order to furnish to the nozzle all the air required to dry the web a blower or fan of considerable size and one requiring considerable power is necessary. Moreover, where the entire current of drying air is delivered from a blower it is difficult to so distribute the air over the web of paper as to produce an even drying in the web, this being partly due to the fact that the drying operation produces considerable volumes of steam which collect in the pockets and prevent the center portion of the web from drying as rapidly as the edges thereof. The drying of the web tends to shrink it somewhat and where the edges dry faster than the center the corresponding shrinkage at the edges is very apt to cause the web to break.

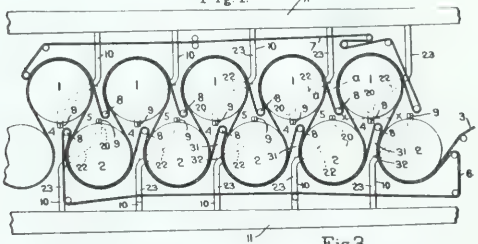
We have endeavored to provide a novel apparatus and method of drying web material by which such material, and especially a paper web, can be dried evenly and rapidly by drying currents of air and with the expenditure of a considerably less amount of power than is necessary where all the drying blast of air is delivered from a blower or fan. We accomplish this object by delivering to each of the pockets a blast of air in such a way that it will induce a current of room air to pass through the pocket from one end to the other whereby the web forming the walls of the pocket is dried partly by the action of the blast of air and partly by the action of the induced current of air. In the preferred embodiment of our invention we provide for subjecting a portion of the area of the web to the combined action of the drying blast or current of air delivered from a nozzle by means of a blower and the current of room air induced by said first-named current of air, and the rest of the area of which the web to the action of said induced current of room air alone. By this means an even drying of the web is secured with the use of a comparatively small forced draft. In the preferred embodiment of our invention, we also provide a nozzle device by which a current-inducing, drying air current is delivered against the web forming the walls of each pocket at a point between the edges of the web and at such an angle to the web that said air current will induce a current of room air which will be drawn across the portion of the web not exposed to the current-inducing air current. The combination of these two air currents operates to rapidly dry the web with the expenditure of minimum power. The relation between the nozzle and the walls of the pocket is such that said nozzle and pocket constitute a sort of injector by which a small current of air delivered from the nozzle induces a comparatively large current of room air through the pocket, thereby providing for securing the desired rapid drying with a minimum expenditure of power. Moreover, in arranging our device, we propose to deliver the currents into the pockets from the front of the machine and in such a way that the induced currents will also enter the pockets from the front of the machine. As a result the steam and vapor is carried off at the back of the machine, thus leaving the front of the machine where the operator stands comparatively free from steam.

To facilitate a clear understanding of our invention and its mode of application and operation we have illustrated in the accompanying drawings and we will now describe that portion of a paper making machine which effects the drying of the paper web and which has applied thereto a practical, commercial embodiment of the invention, but we desire to repeat our statement above to the effect that our invention is not limited in its application and use to a paper drying machine, but is equally well adapted for use in connection with any drying apparatus for drying a web which passes over a plurality of rolls or cylinders.

In the drawings, Figure 1 is a more or less diagrammatic view of the side elevation of the drying rolls of a paper making machine showing our improvements applied thereto; Fig. 2 is an end view of Fig. 1; Fig. 3 is an enlarged section through one of the upper pockets on the line x—x, Fig. 1, showing the way in which the two currents of air enter and pass through the pockets; Fig. 4 is a side view of a practical nozzle capable of carrying out our invention; Fig. 5 is a section on the line y—y, Fig. 4; Fig. 6 is an enlarged section through one of the felt pockets on the line a—a, Fig. 1, showing the manner in which the air currents are utilized for drying the felt apron.

We have shown at 1 and 2 a plurality of cylinders, which may be the drying cylinders of a paper making machine, and over which travels the web 3 that is to be dried. In the construction shown in Fig. 1 the cylinders 1 and 2 are arranged in two rows, one above the other, the cylinders of the upper row being designated 1 and those of the lower row being designated 2, and the web 3 passes over these cylinders successively.

Fig.1.



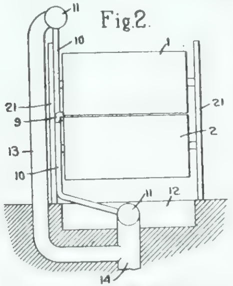


Fig.3

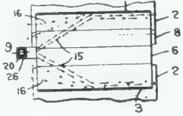


Fig.6.

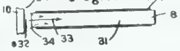


Fig.5

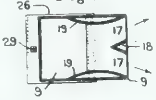
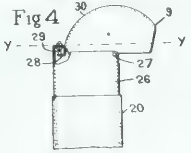


Fig 4



This arrangement of cylinders and web presents a plurality of pocket-like spaces 4 beneath the upper cylinders 1 and between the adjacent cylinders 2, and another series of pocket-like spaces 5 above the lower cylinders 1, the walls of these pocket-like spaces being formed of the web 3 as it is passing from one roll to another. We will hereinafter refer to these pocket-like spaces as pockets.

It is the common practice to employ a felt apron which travels uniformly with the cylinders and which serves to hold the web of paper on the cylinders, thus tending to prevent it from becoming ruptured, and we have herein shown at 6 and 7 two such felt aprons, the apron 7 co-operating with the upper cylinders 1. These felt aprons are shown as passing over direction rolls 8 situated between the various cylinders. The parts thus far described are such as are commonly found in paper making machines.

In applying our improvements to a machine of this type we provide means situated exterior to the pockets 4 and 5 and adapted to deliver into them two currents of air, one a current-inducing drying air current which is forced over a certain portion of the area of the web and another a current of room air induced by the first-named current and which is passed over the remaining portion of the web, the two air-currents combining to dry the web evenly. The current-inducing air current is delivered into the pockets from nozzles 9 which are situated exterior to the pockets and are preferably located on the front of the machine. We will preferably employ one nozzle for each pocket, although this particular arrangement of nozzles is not essential. Each nozzle is connected by a branch pipe or conduit 10 with a main conduit 11 which leads to a suitable blower or air-forcing mechanism, and we will preferably use two such mains, one situated above and the other below the drying cylinders. The main situated below the drying cylinders is placed in the pit 12, which is usually provided underneath the drying cylinders 1 and 2. We have shown the upper main 11 as supplied with air through a supply pipe 13 which connects to the supply pipe 14 which supplies air to the lower main 11, the supply pipe 14 leading to a suitable blower or air-forcing mechanism. The nozzles 9 are designed so as to deliver a current-inducing air current 15, indicated by the full line arrows, against the web 3 forming the wall of the pocket at a point intermediate of the edges of the web, thus current 15 preferably being so directed that it will strike the web 3 at somewhere near its central portion. Furthermore, this current is directed against the web 3 at an angle thereto, and in such a direction as to induce a current 16 of room air into and through the pocket, said current being indicated by the dotted line arrows. We propose to induce a current-inducing air current against each wall of each pocket so that the web forming each of said walls will be acted upon not only by the current-inducing air current 15, but also by the induced air current 16, as shown best in Fig. 3. The current-inducing air current 15 does not of itself act on the web at the entering end of the pocket but only acts on the web between the central portion of the pocket and the exit end thereof. The induced current 16 of room air acts on the web at the entering end of the pockets and then commingles with the air current 15 and both air currents act on the web from the central portion of the pocket to the opposite edge of the web. This is plainly indicated in the diagram shown in Fig. 3.

A comparatively small current-inducing air current 15 is sufficient when properly directed to induce a current 16 of room air, and inasmuch as only a portion of the volume of air constituting the drying current is delivered by the blower or air-forcing mechanism, the remainder of the drying current being the induced current 16, a considerably less amount of power is required to operate the blower than where all of the drying current is delivered from the blower. Moreover, we find that by delivering the current 15 against the central portion of the web and depending on the induced current 16 of room air for drying the edge of the web adjacent the nozzle, the web will be evenly dried so that there will be no danger of its becoming torn or ruptured because of more rapid drying on the edge than in the center. The walls of the pocket together with the nozzle 9 form a sort of injector by which a small current of air delivered from the nozzle induces a sufficient current of room air through the pocket to effect the desired drying of the web.

With the arrangement of cylinders shown in Fig. 1 it will be seen that the portion of the web between any two cylinders 1 and 2 forms one wall of two adjacent pockets 4 and 5, and since two drying currents of air are introduced into each pocket and against each wall of each pocket, it follows that both sides of each portion of web which is free from the cylinders 1 and 2 and extends from one cylinder to the other is acted upon by the drying currents. This arrangement still further facilitates the drying operation.

The two current-inducing air currents 15 for each pocket can be delivered from a single nozzle by employing a properly constructed nozzle, and in the drawings we have illustrated a nozzle designed for this purpose, although this construction is not essential to our invention. The nozzle herein shown is provided with two discharge ports or openings 17 situated at an angle to each other and adapted to deliver two diverging air currents 15 herein illustrated. A convenient form of nozzle adapted for this purpose is one provided in its discharge end with the V-shaped deflector 18 which forms a separation between the two discharge ports 17, and serves to give said ports a divergent direction. We may if desired provide the nozzle with means, such as the plates 19, at each side thereof for decreasing slightly the cross-sectional area of the nozzle directly back of the deflector 18, these plates 19 cooperating with the deflector 18 to more positively insure that the currents of air 15 will be delivered in the inclined direction desired.

We propose to arrange the nozzle 9 on the front side of the machine, that is, on that side of the machine at which the attendant is situated. The advantage of this construction is that the steam and vapor which is given off from the apparatus during the drying process will be drawn through the pockets by the air currents and delivered therefrom on the opposite side of the machine from which the attendant is located. The attendant is thus situated at all times in air which is comparatively free from steam and vapor. We have also designed the nozzles herein shown so that they will not interfere materially with the operation of handling the paper web to guide if from one roll to another in case the web breaks and it is necessary to thread an end of the web through the various cylinders.

The branch pipes 10 will preferably be placed between the ends of the cylinders 1 and 2 and the front side of the frame 21 in which the cylinders are contained and said pipes are so designed as to interfere as little as possible with any necessary manipulation of the paper. Each nozzle 9 will preferably be located substantially centrally of its pocket, and each branch pipe 10 is provided with the vertical portion 20 to which the nozzle is secured, with the inclined portion 22 extending across the end of the drum and with the vertical portion 20 to which the nozzle is secured; with the inclined portion 22 extending across the end of the drum and with the vertical portion 23 connected to the main 11, the vertical portion being situated between adjacent cylinders 2, as shown. This arrangement is one in which the branch pipes 10 and nozzles are so situated that they do not interfere with the attendant introducing his hand into the pocket to lead an end of the web from one cylinder to the next one. We will preferably employ a nozzle which can be collapsed more or less when not in use, thus permitting it to be carried still more out of the way than when in its operative position. In the drawing we have shown the nozzle as supported on a telescope pipe section 26 which telescopes into the upper end of the portion 20 of the branch pipe 10. The nozzle 9 itself is pivotally mounted on the telescope pipe section 26, as shown at 27, so that said nozzle can be turned back into line with the pipe section, as shown by dotted lines, Fig 4. This nozzle is shown as made of sheet metal bent back into the desired shape and is provided at its rear end with a lip 28 adapted to engage a set screw 29 carried by the upper end of the pipe section. The upper side 30 of the nozzle is curved on an arc struck from the pivot 27 as a center so that the nozzle can swing back on its axis into its inoperative position. The construction herein shown operates also as a means for drying the felt aprons 6 and 7, for it will be seen from Fig. 1 that the air currents which pass through the pockets will act on the portion of each felt apron that is separated from the web of paper and passes over the rolls 8. The air currents thus have a drying effect not only on the web of paper but also on the felt. This is a very great advantage because it prevents the felt from becoming unduly wet.

In the construction shown in Fig. 1 the felt aprons 6 and 7 pass over direction rollers 8 and said aprons have formed therein pockets 31 which are commonly referred to in this art as the felt pockets. We have provided herein means for delivering air currents through these felt pockets to assist in drying the felt, and the air currents which thus pass through the felt pockets are of the same nature as those which pass through the pockets 4 and 5, that is, they are formed from a current-inducing air current commingled with an air current induced by the first-named current. In order to secure this effect we provide each of the branch pipes 10 with a nozzle 32 directed toward the adjacent felt pocket 31, said nozzle delivering into said pocket a current of air designated by the arrows 33. This current of air 33 induces a current of room air designated by the arrows 34, and the two combined currents pasing through the pocket 31 assist in drying the felt apron. The walls of each pocket 31 together with the nozzle 32 constitute a sort of injector apparatus by which a drying current of air can be forced through each of the felt pockets with a minimum expenditure of power.

While we have illustrated herein our invention as embodied in a drying apparatus of a paper making machine we do not wish to be limited to its use in this connection as it will be obvious that the principle of the invention may be applied to different devices where the web to be dried passes over supports which form in said web one or more pockets arranged so that the injector above described can be secured.

G. C. Robinson, who for some time past has been representing John Dickinson and Co. in Old Country lines in Toronto and vicinity, has gone to Vancouver, where he will have charge of the trade in British Columbia. He is succeeded by R. G. Milne, who for four years has been chief of the selling staff in Montreal and has offices at 73 Wellington Street West, Toronto.

UNITED STATES NOTES

The sulphite mill and other property of the bankrupt Battle Island Paper Company, at Fulton, N.Y., will be sold in mortgage foreclosure proceedings as soon as the necessary legal formalities can be complied with. Judge George W. Ray explained that he has instructed the attorney for the Columbia Knickerbocker Trust Company of New York to prepare the formal order, which he will sign upon presentation.

* * *

The Agasote Millboard Company, of Fernwood, N.J. is making provisions to more than double the output of the present plant at Agasote, N.J., just outside of Trenton. The company has awarded a contract to design two large buildings, to be of brick and structural steel, with heavy timber and plank roof construction covered with slag roofing. The work of erection will commence at once, and the buildings be pushed through to rapid completion.

* * *

The Baltimore and Southern Paper Trade Associations held its regular quarterly meeting at the Hotel Rennert, Baltimore, Md., Thursday April 15. Several matters of great interest were brought up and discussed. A large attendance was reported.

* * *

Bulkley Dunton and Co., of 75 Duane Street, New York City, report that they now have in their service five ships chartered to transport wood pulp from the Scandinavian ports. They have one ship scheduled to reach New York this week, one in May and one in June.

* * *

Work on the new sulphite mill, being built in connection with the Northwest Paper Company's plant, Cloquet, Minn., excavation for which was started October 1, 1914, is progressing rapidly, and it is expected that the buildings will be complete, and the mill in operation by June 1.

* * *

According to information made public at Washington, D.C., this week there is under consideration at the Department of Commerce the creation of a bureau of information on the dyestuffs industry, due to great interest and concern because of the lack of dyestuffs not now obtainable from Germany on account of the embargo. According to the Department, approximately $6,000,000 is to be expended within the next few months, and it is said that the simpler dyes heretofore purchased in Germany at a cost of $12,000,000 annually will be manufactured in this country.

* * *

The latest compensation bill introduced last week at Albany, N.Y., takes the management of the State Insurance Fund away from the Workmen's Compensation Commission, and turns it over to a new State officer, to be known as the Manager of the State Insurance Fund. He is to be appointed for five years by the governor at a salary of $7,000, and may have a big staff of experts and assistants.

* * *

Ex-Congressman Herman A. Metz., chairman of a delegation interested in the dyestuffs supply of this country, has written to Secretary Redfield at Washington, D.C., for information concerning the recent report from the Department of Commerce that six plants with a capital of $5,000,000 intend to manufacture dyes. Mentioning that the department has omitted to announce the names of the firms, Mr. Metz says the textile manufacturers are left in the dark, and are unaware where or in what quantities they may obtain dye materials.

* * *

William M. Loveland, secretary of the Kalamazoo Paper Company, Kalamazoo, Mich., for many years, and probably one of the best known paper manufacturers in the Middle West, has resigned his position to become president and general manager of the Watervliet Paper Company. The announcement last week created a surprise, as no one knew that such a change was being contemplated. Charles B. Hays, former president of the Watervliet Paper Company will devote his time to his real estate business in Kalamazoo.

* * *

TO DEVELOP WIDER MARKET FOR B. C. FOREST PRODUCTS.

Victoria, B. C. April 17.

The Hon. W. R. Ross, Minister of Lands for British Columbia, who during the past three years has organized a business administration and protection of the forests of that Province is now undertaking the systematic development of wider markets for British Columbia forest products. The importance of this work to the Province cannot be overestimated.

The annual value of the forest products of British Columbia in 1913 was nearly $34,000,000. The forests of the Province are so extensive as to support in perpetuity five times as great an industry, or one worth $170,000,000. This sum of money, practically all of which would be distributed in the Province for labor, supplies and transportation would ensure continued prosperity to all classes, benefitting the farmer with the tradesman and mechanic. The markets of British Columbia lumber and other forest products must be found outside British Columbia. Mr. Ross has, therefore, been active in securing the appointment of the Chief Forester of the Province as a special Commissioner of the Dominion Government to investigate the possibility of shipping Canadian lumber to all the important lumber markets of the world. He will visit in particular the United Kingdom, France, Italy, South Africa, Australia, New Zealand, India, China and Japan. The information gained from this investigation will form the basis of the steps to be taken by Mr. Ross in making it easier for British Columbia Manufacturers to export to foreign markets. The Minister has also under consideration plans for co-operating with the timber industries of the Province in creating a greater demand for provincial lumber products in the Canadian Prairie and Eastern Canada. The problem of increasing the British Columbia export trade in forest products is one which means milions of dollars to the people of the Province, and for this reason it is receiving careful consideration at the hands of the Government.

BRITISH TRADE NEWS

SPECIAL TO PULP & PAPER MAGAZINE

Owing to increased subscriptions being given, British Dyes, Ltd., will proceed to allotment. This new company is the outcome of the agitation to formulate a national scheme for the production of dyes for use in the paper and other industries. Recent meetings have been attended in Manchester by men who were looking after Canadian interests and the question was put to the chairman of one of the gatherings: "Is the area of the new company's operations to be confined to the United Kingdom? In Canada there is a disposition to support the scheme if an assurance could be given that the Canadian users of dyes may be permitted to benefit." The answer given by Mr. Falconer, M.P., the chairman, was to the effect that the view of the Board was that it would be impossible to discriminate against the colonies or dependencies. Every British subject would have an equal right or opportunity to subscribe. From all accounts, the scheme is now to be pushed forward with much rapidity. Mr. Gordon, K.C., a well-known London lawyer, says that the British dye industry in the past has suffered severely from the administration of the patents law. The Germany monopoly was largely due to the fact that they had entrenched themselves behind a series of stragetical patents which not only secured them the rights, but prevented anyone else from introducing improvements. If the new industry was to be saved from peril after the war was over, it would be necessary to amend the patents law so as to prevent the exercise by the Germans of patent monopolies, and he suggested that this could best be done by a system of free manufacture, with royalties sufficient to satisfy the legitimate requirements of the patentee.

* * *

The jury appointed to inquire into the cause of the collapse of the new machine house at the paper mill, in Bury (Lancashire), owned by Messrs. Wrigley and Sons, Ltd., have agreed that the cause of the accident was the result of grave errors made in the design of the roof of the building, as admitted by the designer (Mr. Murphy), an engineer of London, but they did not think, or hold, him guilty of criminal negligence. The jury was of the opinion that the contractors should have submitted the plans to an independent body, viz., an expert, before giving a guarantee in regard to the construction of the building, and they also considered that the supervision of the architect constantly on the job was lax, and deserving of censure, although he was pressed to get on quickly with the work by Mr. Arnot, the managing director of Messrs. Wrigley and Sons, Ltd. It will be remembered that this accident resulted in the loss of many lives and Canadians can learn many lessons from it. In the first place when a building like a machine house is to be constructed of reinforced concrete with steel or iron frame work the usual course of the [illegible] should be that the plans are carefully checked and then submitted to men who are thoroughly qualified. The engineer who designed the roof for Messrs. Wrigley & Sons held no [illegible] and he was not experienced in work of the kind. Of course, Messrs. Wrigley left the whole job in the hands of the contractors and their engineer, and were not in the circumstances responsible for the loss of life. They have suffered great loss, and are very fortunate that their new 110-in. papermaking machine was not smashed in the fall of the building.

* * *

The Trade Board figures for March show that the exports of the British paper industry has experienced a considerable drop when compared with the corresponding month of last year. Paper ofall kinds, boards, playing cards, bags and envelopes were shipped in the following quantities: In March, 1914, 302,703 cwts., value £313,820; in March 1915, 217,967 cwts., value £222,594.

For the first three months of the year the total exports reached 636,531 cwts., as against 895,474 cwts. There is an all-round decline in the consumption in foreign countries, but in the case of British colonies, dependencies, and protectorates, there is in some cases a rise in the exports to them. Canada imported the following papers in March from the United Kingdom:—

	1914.	1915.
	Cwts.	Cwts.
Writing paper	252	142
Printing paper	8,517	3,348
Unenumerated paper	516	270

Of course, the paper sent to Canada is of the finest quality, and suitable for high-class printing. The shipments to the States also declined. The following figures show the details of the exports: Writing paper, 13,350 cwts., as against 16,141 cwts. in March, 1914; printing paper, 108,080 cwts., as against 156,238 cwts.; unenumerated, 4,307 cwts., as against 5,256 cwts. The great difficulty to contend with is the transport and shipping, which no doubt have held up most of the production of the mills. On top of these are the high tariffs, and the French and Belgians are naturally at present very small buyers in the paper market.

* * *

The imports also show a decline, but the drop is not so great as that shown in the exports. The decline may also be looked upon as infinitesimal when one considers that Germany, Belgium, and part of France and Russia are out of the market. Those countries knocked out of the import trade have had a fair share of their dealings taken up by the Scandinavians and the United States. The imports in March were as follows:—1914, 1,062,749 cwts., value £638,657; 1915, 900,-4[illegible] cwts., value £[illegible].

No supplies were received from Newfoundland, and in the case of Canada the Trade Board furnishes no details. The figures for the three months of the year are as follows:—[illegible] cwts., as against [illegible] cwts. in 1914. Particulars of some of the supplying countries may be found interesting:—

	1914.	1915.
[illegible]	Cwts.	Cwts.
Sweden	[illegible]	[illegible]
Norway	[illegible]	[illegible]
U. S. A.	3,903	8,095
[illegible]		
Sweden	[illegible]	[illegible]
Norway	[illegible]	[illegible]
U. S. A.	[illegible]	[illegible]

Coated Paper:		
Belgium	2,300	1,366
France	218	306
U. S. A.	207	358
Packing and Wrappings:		
Russia	11,449	110
Sweden	130,002	135,411
Norway	87,286	154,345

It will be seen from these figures that the Scandinavians are doing very well in packing, wrapping and paper not on reels.

The imports of pulp rose to 43,147 tons, compared with 39,217 tons in March, 1914. The following are the details:

	1914. Tons.	1915. Tons.
Bleached Chemical (dry)	1,083	2,016
Unbleached Chemical (dry)	12,713	7,611
Chemical Pulp Total	13,796	9,627
Chemical Wet	....	....
Ground Wood (moist)	25,321	32,579
Ground Wood (dry)	100	941
Ground Wood total	25,421	33,520

No supplies of ground wood were received from Canada or Newfoundland. Norwegian supplies rose to 31,505 tons, as compared with 24,113 tons in March, 1913. The total supplies for the first three months of the year now reach 123,918 tons of all kinds of pulp, as against 167,699 tons for the corresponding period in 1914. It must, however, be remembered that heavy buying was engaged in during September, October, and November last year, and stocks are plentiful.

NEW IDEAS FROM ABROAD.

Under the caption "Practical and Technical Notes," "The World's Paper Trade Review," London, presents in a recent issue the results of some Continental investigations in paper products. It quotes "Wochenblatt" first, in which Mr. Voraberger has given some useful notes on the manufacture of body papers for chromo and other coated papers. Very considerable experience and care are necessary for this class of work, and the raw materials must be very carefully selected. They must be of first-class quality, since the paper must be absolutely free from knots, splinters and sand. In the case of those papers which are composed largely of mechanical wood, the result depends almost entirely on the quality of this material, and a grade very specially prepared for the purpose is before all things necessary. The loading materials must also be carefully selected, just as for litho papers special care being taken to keep out all sandy impurities. Coming to the work on the machine, the writer notes that the strainer slits must not be wider than 0.3 mm. (11-thousandths of an inch), and in clearing them great care is required to avoid damaging the cut. The machine wire must be perfectly sound without buckles or creases which would make thin places in the paper. Many papers tend to curl up when coated and stretch on damping; this trouble is to be avoided by suitable adjustment of the shake, also by good working of the couch and wet presses. Curling is caused by the tendency of the fibres to arrange themselves in the machine direction of the web, and anything which will impede this tendency will help to reduce the curling of the coated paper. Good pressing also assists the drying which must be done very gradually; the machine must be provided with an exceptionally long range of drying cylinders, and the first cylinder must be only slightly heated in order to avoid making a brittle paper. The dried paper should be well cooled after it has passed the calenders and is of the most important points to be ensured, and this depends in the first instance on the accurate setting of reeled up. The uniform hardness of the reels is one the slices. When a reel which is hard at the edges and soft at the middle is slit, one edge of the slit paper becomes baggy, and grave troubles are caused. Paper which is required for fine chromo work must have an extraordinarily fine and even surface, but the same must not be produced by high glazing, it must be inherent in the texture of the paper itself. For common work such as labels, etc., a higher glazing is permissible.

Talc in Treating Waste Paper.

Most schemes for the re-use of old papers involve the removal by chemical-mechanical means of the printing ink. This entails such a loss of fibre that it is usually cheaper to use new mechanical or chemical pulp.

A recently developed method, described in the Austrian "Zentralblatt," involves the use of talc and can be applied in two ways:—

Procedure A.—The papers are broken up in a shredder or kollergang. The mass falls into a chest provided with a stirring apparatus and sand trap. Water is added and then the thin pulp is run through a concentrator and the water gradually removed; the black suspension of color then flows off. From here the stuff goes to a refiner and then to a washing hollander, where after a second washing, it is thickened as much as possible by the washing drum and 5 per cent to 10 per cent talc is added. This gives a mass with a good white color which can be used as ground wood or cellulose.

Procedure B.—The old newspapers are put through a kollergang and then into a washing hollander. After washing, 5 per cent to 10 per cent of talc is added, and the stuff thus whitened can be beaten and run on the machine in the usual way or put in a drainer and then used as required as substitute for ground wood or cellulose in the beater. If the stuff goes, as is possible, directly to the stuff chest, care must be taken to run the other stuff in gradually from the beater.

Another way is to mix the stuffs together in a mixing hollander and then emptying into the stuff chest.

The advantage of this process may be illustrated for the old formula:—

Sulphite or bleached soda pulp	30
Mechanical pulp—first grade	60
Broke, loading, sizing, and color	10

Using in its place the following:

Chemical pulp	5 to 10
Mechanical pulp	20 to 25
Fibre by the talc method	50
Talc or clay	10
Broke water glass, etc.	10

Color, size, etc., half the usual amount.

The paper is excellent for printing, especially on the cylinder press. The talc closes the sheet and with calendering gives a good surface for the finest hair lines and half-tones.

Since the apparatus for the new process is already on hand in most paper mills, new and costly equipment is not necessary.

Ottawa Notes

Ottawa, Ont., April 25. The prorogation of Parliament a week ago eliminated the possibility of the passing of the drastic Bradbury Bill for the prevention of the pollution of navigable waters, and thus relieved pulp and paper manufacturers of a source of interference with their operations, this year at least, which bid fair to prove troublesome. The bill, which was the only legislation other than the tariff introduced this session affecting the lumber trade, fixed heavy penalties for the discharge of sawdust, chips, bark, etc., into navigable streams or streams flowing into them. It was approved by the House of Commons on its first reading and sent to a special committee for amendment. Although the committee reported it back to the House in the rush and hurry towards the end of the session no action was taken toward enacting the bill into law.

Judgment has been given by the Board of Railway Commissioners refusing the application of Mr. E. W. Roberts of Montreal, for a special winter freight rate on rough, unpeeled pulpwood to be given by Canadian railways. Mr. Roberts, who has had this matter before the Board for some time, had pointed out the difference of weight between rossed wood and green unrossed wood. Where the unrossed wood weighed about 5,000 pounds to the cord, the rossed wood weighed approximately three-fifths of this. He had maintained that there was a large amount of unrossed wood owned by operators of small means who were unable to obtain capital to cut and ross the wood and wait until it was sufficiently seasoned, and he was of opinion that a special rate on unrossed wood would be justifiable. His application was for a special winter freight rate on the unrossed wood to be applicable until May 10, the rate to be exactly the same per car as a similar carlot would amount to for the rossed wood during that period.

Under the tariffs, says the judgment, a car under 35 feet in lenght loaded with pulpwood on shipment to a point in the United States to which destination the applicant desired to ship, had a minimum of 35,000 pounds or of 40,000 pounds when the car was over 35 feet in length. The seasoned wood, when loaded to the minimum, would represent 10.3 and 11.2 cords respectively, while the unseasoned wood would represent 7 and 8 cords respectively. In support of his contention Mr. Roberts stated that if the railway met the shipper half way and consented to haul the extra amount of water as contained in the unseasoned wood, the railway would obtain additional traffic. It would afford the man with only a small capital who was unable to erect a rossing mill an opportunity to ship his rough wood to a United States mill which could handle it.

The Board, in refusing the application, takes the attitude that it has not been shown that the present rate on unrossed pulpwood is unreasonable and that it is neither the duty of the railways to equalize the disadvantages of the shipper from the standpoint of costs of production or of the Railway Commission to oblige them to do so.

The J. R. Booth Company, which has been very unlucky in the way of accidents to its plant during the last ten or twelve months, had another misfortune a week ago when the dam controlling the water supply broke. The water flooded the powerhouse and one of the pulp mills and did considerable damage to the rest of the plant. The accident will keep 1,000 men, who were to be employed last week because of the intended resumption of summer activities, out of work for a few days longer.

A case where a disagreement over a contract to drive timber had its sequel in the Hull courts is that which concerns an agreement between the MacLaren lumber and paper firm of Buckingham and one Damas Gauthier, a farmer living on Severn Creek, in the Lievre Valley district. Gauthier contracted with the MacLaren's to drive logs on Severn Creek, but the company afterwards sent one of its foremen, J. Whitfield, to take over the work as he was not performing it satisfactorily. A quantity of logs had become piled up on the banks of Gauthier's property on Severn Creek and he gave Whitfield but two days to remove them. On the third day, as Whitfield was coming with his men, Gauthier fired at him, fortunately missing. He was afterwards arrested.

The Railway Commission has refused an application by the Canadian Pacific Railway to have its responsibility for fires originatng along its track limited to the fringe of its right-of-way. The Railway Board, on advice of Mr. Clyde Leavitt, chief forester of the Railway Commission, decided to continue the present regulations whereby railways are responsible for fires within 300 feet of their tracks.

The Government has been advised of tariff changes affecting pulp and paper exports on the part of three countries. France has granted a reduction of 60 per cent in the customs duties on paper and pulp for press purposes imported into that country. The Russian Government has put a new, increased tariff into effect, but specially exempts mechanical pulp, chemical pulp, paper clippings and waste and cellulose pulp made from rags. Other paper products, however, will be liable to increased tariffs of 10 per cent. The third country to raise its tariff walls is South Africa which has put into effect a general increase of 5 per cent in ad valorem duties.

The alleged alienation of forest wealth as well as other kinds of natural resources under the late administration was the subject of considerable discussion during the concluding days of the session of Parliament, just closed. One case which concerned pulpwood areas was known as the Cedar Lake berth case. The statement was made in a report presented by T. R. Ferguson, K.C., special Government Commissioner, that A. W. Fraser, K.C., of Ottawa, had tendered in his own name for Berth 1107 on Cedar Lake, Saskatchewan, and was successful, and that he tendered in the name of W. H. Nolan, of Montreal, for Berth 1108 on Moose Lake, Saskatchewan. It is stated that Mr. Fraser afterwards claimed that the islands and the lake were to be included as well as the sixty miles of the mainland mentioned in the notice calling for tenders for Berth 1107 and that on application has additional timber was granted to him while islands in Moose Lake were also similarly granted to Mr. Nolan, both without extra benefit to the public treasury. Berth 1107 was afterwards assigned to the Spruce Lumber Company, which is now its licensee, while Berth 1108 was assigned to the Imperial Pulp Company, Ltd.

MAC.

Large crews of river drivers are now being shipped from Bangor, Me., for the Connecticut River drive, and more will be sent to the Maine drives during the coming week. The Moose drives are likely to be slow in starting in, owing to the scarcity of water.

PULP AND PAPER NEWS

A. C. Hunt for the past seven years manager of the Leader Publishing Co., Regina, Sask., recently resigned, and has associated himself with the John Martin Paper Co., Limited, who have their head offices and warehouse in Winnipeg, and branches in Edmonton and Calgary. Mr. Hunt has been elected a director of the company.

United Paper Mills, Limited, Toronto, are now safely housed and settled in their new home in the Bond Building at the corner of Temperance and Sheppard Streets, where their floor space has been greatly increased and excellent shipping facilities are afforded as well as abundance of light. They were formerly located a t118 Richmond Street West on an upper floor, but are now on the ground level.

A charter has been granted to the Canadian Wallboard Co., with headquarters in Toronto and a capital stock of $50,000. The company are empowered to manufacture, sell and deal in wood fibres, pulp wood, wood pulp of all kinds, wall boards, sheathing papers, wrapping papers and paper specialties of all kinds. It is understood that the new concern has been incorporated as a selling company.

J. M. Dent, head of the well known London, Eng., publishing firm of J. M. Dent and Sons, Limited, spent a few days in Montreal, Toronto and other cities recently with the Canadian manager, H. Button. Several books by Canadian writers will shortly be published by the firm.

A fire broke out recently in the premises of the V. E. Ashdown Co., wall paper importers, 744 Yonge St., Toronto, and considerable loss was occasioned to the stock by smoke and water. The damage was about $3,000.

Of late years many daily papers have been started in Vancouver and the latest venture in that line, the Journal, published by Hon. Joseph Martin, has suspended after a few weeks, owing to lack of financial support. Mayor L. D. Taylor, who recently relinquished control of the "World," intends launching this month another daily, which will be known as the "Globe." This will make four daily publications in the Pacific Coast city.

According to the annual report of Hon. G. H. Ferguson, Minister of Lands, Forests and Mines for Ontario, which has just been issued, covering operations to the end of October last, there was quite a falling off in the quantity of pulp wood cut on Crown lands as compared with the previous twelve months. 104,544 cords were taken off last year compared with 131,434 cords in 1913. The total area of Crown lands disposed of by sale and leave during the year was 174,961 acres for a value of $156,704 as compared with 260,873 acres sold and leased in 1913 for $259,956. The total recollection on account of the sales, leases, etc., was $191,584. The net decrease in the number of purchases was 363. The falling off in the number of sales made as well as receipts from that source was due to monetary conditions and the business depression occasioned by the war. The production of pine timber, saw logs, square timber, etc., in feet, board measure, during the year was 382,582,027, being 22,204,839 feet in excess of the output in 1913. The output of timber other than pine was 77,451,857 feet as against 64,4097,436 feet the previous year. There were taken out 5,439,845 pieces of railway ties as against 6,355,828 pieces in 1913. During the year practically 2,200 persons took possession of free grant land for a total area of 268,238 acres, which is greater by 28,966 acres than the previous twelve months. The northern portion of Ontario benefitted mostly by the settlement.

The Rathbun Match Co., Limited, of Deseronto, Ont., with a capital of one hundred and twenty-five thousand dollars, have been granted a charter. The company are empowered to manufacture and deal in all kinds of matches and to make and deal 'in lumber, woodenware, and boxes of wood, paper, papier mache or other material.

The Toronto Paper Manufacturing Co.'s plant at Cornwall, which was closed down for three weeks owing to government repairs to the Cornwall Canal, resumed operations last week, after being thoroughly overhauled. Forbes Wood, superintendent, has returned, after spending a holiday in the leading paper centres of Massachusetts.

Work is progressing favorably on the large new building of the Butterick Publishing Co., of New York, which is being erected on Wellington Street, Toronto, west of Spadina. The structure, which will be several storeys high, now has the walls about half completed, and it is expected that construction will be all finished by the middle of the summer.

The Rudd Paper Box Company, 372-376 Richmond Street, West, Toronto, whose large plant was wiped out by fire on January 28, is again running to full capacity and employing about one hundred and fifty hands. A. E. Rudd, President of the Company, lost no time after the disaster in getting matters under way, and all the box making equipment, printing presses, etc., were overhauled, new stock purchased and building operations carried on, so that five weeks later a portion of the plant was running. In the meantime many orders of the firm were filled by other paper box establisments in the city, and there was no great interruption of business. The number of die presses has been increased to nine, and the company are very busy at present with orders for hat boxes, canisters, mailing tubes, and folding boxes and also in the printing line. The set-up box department is the only branch which is not rushed. An up-to-date sprinkler system has been installed throughout the building with a fifteen thousand gallon tank and every precaution taken against a similar visitation from flame. Recently an order was received from a western Ontario firm for two million canisters, in which narrow strips of fly paper, which are unrolled, will be inserted. This fly paper was formerly made in Germany, but is now being manufactured by a leading Ontario concern. Although there has been an increase of twenty per cent in glue and glaze paper, formerly imported, but now made in Canada, has gone up from two dollars to three and three and half, there have been no changes in the prices of general lines of paper boxes made by th Rudd firm.

The Markets

CANADIAN MARKETS

Since the last report, conditions in the news print market have picked up considerably, and a general improvement is noted. Many of the larger papers across the line and in Canada are enoying a liberal advertising patronage during the spring season, and this has resulted in increased demand. The big plants, which were operating in some instance only five days a week, are now running to capacity again, and prices are naturally a little firmer. Some of the regular customers have increased their orders from ten to fifteen tons a month, and the outlook for the next few weeks is good. Stocks, which were getting low are also being replenished.

In the book and writing line there is also a better feeling prevailing and, while there is no great rush, orders have been coming in more freely and with excellent water conditions, it looks as if there would be more satisfactory business for the spring months at any rate. Coating paper plants are also busier, and there is a pretty fair demand for special lines. One leading paper dealer remarked that, since the middle of March things had been gradually getting better and he saw no reason why a steady improvent would not continue. Wrapping papers are moving livelier and kraft is in steady requisition.

The ground wood market is dull and prices low and the same may be said of the sulphite situation. Buying is in limited quantities and many mills are holding off. Just what change will take place in the near future is speculative. Owing to the increased rate in postage it has been feared that correspondence would decline to a considerable degree and that envelope manufacturers might experience a set back. So far this has not occurred, but what may eventuate cannot be prophecied at present. One prominent maker stated this week that he did not think it would make any material difference as almost as many envelopes could be used for delivery purposes and that circular letters and printed matter was not affected by the war tax if mailed as third class matter, open for inspection. The tax applies on first class mailing matter only and some makers of envelopes, turning out specialties, which are apparently sealed, yet open for inspection, are featuring this kind with [illegible] which [illegible].

In the rag and paper stock areas there is not much doing. The market has gone back to its former quiet state and buying is carried on only in small quantities.

Quotations, f.o.b. Toronto, are:

Paper.

News rolls, $1.85 to $2.10 at mill, in carload lots.
News, sheets, $2.00 to $2.10 at mill, in carload lots.
Book papers (carload), No. 3, 4.00c to 4.25c.
Book papers (ton lots), 4.25c to 4.75c.
Book papers (carload), No. 2, 4.50c.
Book papers (ton lots), No. 2, 4.75c to 5.50c.
Book papers (carload), No. 1, 5.00c to 5.50c.
Book papers (ton lots), No. 1, 5.50c up.
Sulphite bonds, 6½c to 7½c.
Writings, 4½c up.
Grey Browns, $2.10 to $2.75.
Fibre, $3.00 to $3.75.
Manila, B., $2.25 to $3.25.
Manila, No. 2, $3.10 to $3.50.
Manila, No. 1, $3.35 to $4.00.
Unglazed Kraft, $3.40 to $4.50.
Glazed Kraft $4.25 to $5.50.

Pulp.

Ground wood pulp (at mill), $15 to $16.
Ground wood, $21 to $23, delivered.
Sulphite (unbleached), $38 to $42 del. in Canada.
Sulphite (unbleached), $39 to $44, delivered in U.S.
Sulphite (bleached), $54 to $58.

Paper Stock.

No. 1 hard shavings, $2.00.
No. 1 soft white shavings, $1.85.
No. 1 mixed shavings, 45c.
White blanks, 97½c.
Heavy ledger stock, $1.60.
Ordinary ledger stock, $1.30.
No. 2 book stock, 50c.
No. 1 book stock, 85c.
No. 1 Manila envelope cuttings, $1.25.
No. 1 print Manilas, 70c.
Folded News, 40c.
Over issues 45c.
No. 1 cleaned mixed paper, 30c.
Old white cotton, $1.90.
No. 1 white shirt cuttings, $5.00.
Black overall cuttings, $1.70.
Thirds, blues, $1.30.
Black linings, $1.75.
New light flannelettes, $4.25.
Ordinary satinets, 90c.
Flock, $1.00.
Tailor rags, 85c.
Manila rope, 2½.
No. 1 burlap bagging, $1.00.

Quotations f.o.b. Montreal are:—

Book—News—Writing and Posters.

Roll News, $40 to $43 per ton for large orders, $45, to $50 per ton for small orders.
Ream News, $45 to $47 per ton for large orders; $50 to $60 per ton for small orders.
No. 1 Book, 5½c to 6½c per lb.
No. 2 Book, S.C., $4.50 to $4.75 in large quantities; $4.75 to $5.50 in small quantities.
No. 3 Book, M.F., $4.00 to $4.25 in large quantities $4.40 to $4.50 in small quantities
Writings, 5c to 11½c.
Sulphite Bond, 6½c to 8½c.
Writing Manila, 5c.
Colored Posters, 4½c to 5½c per lb.

Wrappings.

Grey Browns, per 100 lbs., car lots, $2.25 net; 5 tons $2.45; 2 tons $2.50; 1 ton $2.60; less, $2.75.

Red Brown, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, $3.15; less $3.25.
B. Manila, car lots, 2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, $3.15; less, $3.25.
No. 2 Manila, car lots, $3.10; 5 tons, $3.20; 2 tons, $3.30; 1 ton, $3.40; less, $3.50.
No. 1 Manila, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton, $3.65; less $3.75.
Kraft, $3.75 to $5.00.
Fibre, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton, $3.65; less, $3.75.
Fibre, $2.75 to $3.50.
Manila, B., $2.50 to $3.25.

On large orders to the jobbing trade some manufacturers are quoting 10 per cent off the above prices on wrapping.

Pulp.

Sulphite easy bleaching, $43 to $45 per ton.
News quality, $41 to $42 per ton.
Bleached sulphite, $54 to $59 per ton.
Kraft pulp, $3.60 to $4.00.
Ground wood, No. 2, $22 to $24, delivered in United States.

NEW YORK MARKETS

(Special to Pulp and Paper Magazine)

New York, N.Y., April 25, 1915.

Comparatively little change has been reported in the market for mechanically ground wood pulp during the past fortnight. Water is still plentiful in the rivers and streams at the various manufacturing points in the East, and mills are grinding practically at capacity. As far as new business is concerned, there is very little reported in any quarter. Consumers have adequate supplies on hand, and in most cases are grinding sufficient for current needs. Those mills, however, that are manufacturing pulp for sale only are accumulating abundant stocks, and it is the concensus of opinion among those interested in local circles that the supplies on hand this summer will be more than sufficient to meet all needs. This condition, if true, will naturally mean an easing in price for this commodity. At present, though, values are maintaining a fairly even range, and quotations noted two weeks ago continue to be the market in this section. Contract business is extremely light at the present time, but those in a position to know the trend of the market are convinced that it will not be very long before there will be numerous inquiries, not only for additional spot quantities, but also for requirements over the next year or two.

A somewhat of a change has been noted in the market for chemical pulps. When last reported these items were not commanding a very heavy movement among the mills in this country, owing to the increased prices being asked by Scandinavian mills. This situation, it was thought, was due to the fact that many of the consumers in this country had a plentiful supply of stocks on hand. The situation, however, appears now to have changed, as numerous inquiries have been reported during the past interval, and in most cases the orders carry instructions for prompt shipments. This is undoubtedly due to the fact that the American mills have not been so heavily stocked as was generally supposed. In the meantime Scandinavian mills are upholding their previous high prices and it is reported that the high levels are met without opposition. The only thing that deters from a heavy movement is the fact that consumers are still very conservative in their orders, and are not laying in any more stocks than are actually needed to tide them over for a very short time. They appear to believe in the slogan "Buy small, but buy often," as comparatively few of the orders now placed call for more than a week's supply. The situation in Europe cannot, according to authentic information, affect the market for chemical pulps on this side for some time to come. Advices from the various ports of entry state that the stocks on the dock in each case are sufficient, if added together, to supply the needs and requirements of American mills for the next six months. With this situation in view, it is a wonder to many that the high prices now being asked are being met without competition.

Not only does the paper stock market reflect a very quiet and uninteresting tone in New York City, but in Philadelphia, Boston, Chicago, and the other packing points as well. The principal feature of the market during the interval was the easing in roofing stocks. These grades have for several months past been the mainstay of the market, but buying has at last come to its end, and as stocks were comparatively heavy, prices were forced off about $3.00 per ton. It is the concensus of opinion among local packers that this is only a temporary lull in this particular grade, and that a return to old prices will soon be recorded. Another feature in the stock market was reported among the packers of mixed papers. Though this class of stock is selling from 20c to 25c, it is understood that several parcels were disposed of during the past week or ten days at figures that represent about half of the market prices. It is true that this grade has been steadily increasing, and packers have in several cases been forced to take extra space in order to store the stocks. This being the case, it is more than likely that there were some that were willing to sacrifice their stocks rather than take on a higher overhead expense.

As reported in the last issue of the Pulp and Paper Magazine, the low mark in the local paper market has at last been reached. The situation is not yet, however, satisfactory, but there is a decidedly better feeling among the local paper dealers and manufacturers. As a matter of fact, buying during the past ten days has been much better than it has for any corresponding period during the preceeding two months. In some grades values are not over strong, and manufacturers in their greed for business are not averse to slashing prices. Newsprint, in particular, is laboring under a very keen competition, and while business generally is reported in fairly good proportions, profits are comparatively small. If this situation continues, it cannot but greatly affect the net revenues of the large manufacturers in their annual statements for 1915. The side-run news situation is weak, due to a comparatively small business passing. A fortnight ago tissues were subject to severe price-cutting, but the market has returned to a more normal condition. It was stated that many orders were placed and much business transacted on a basis of 37½c. This was probably due to over-stocking on the part of the mills, and as soon as their supplies were slightly reduced they were in a position to again quote on a basis of 40c to 42½c. Nevertheless, it is understood that certain factors in the middle west are still quoting 38c f.o.b. mill. Manilas and fibres are not over strong in price, many manufacturers are inclined to shade the latter, but no definite information can be obtained as to actual sales.

Book papers are maintaining their own on a fairly good basis. Prices are of reasonable proportions, and it is generally thought that the present situation will continue for the present at least. Writing, Bonds, Linens and Ledgers are without change. Movement generally is in proportion to the season's requirements, and in some sections it is reported that the passing volume is ahead of the corresponding period of last year. Mills are running on a good basis, but this is due to the fact that stocks have been very low for several months past. The paper board situation has shown a slight improvement since last reported. While the market is far from satisfactory as far as buying is concerned, prices are fairly well maintained, and it is the general opinion among the local distributors that increased prices will soon be reported.

Pulps.

Ground Wood, No. 1, $19 to $20, delivered.
Ground Wood, No. 2, $15 to $16, delivered.
Unbleached Sulphite, dom., 2.20c to 2.75c, delivered.
Unbleached Sulphite, impt., 1.80c to 2c, ex dock, N.Y.
Bleached Sulphite, domestic, 3c to 3.40c, delivered.
Bleached Sulphite, impt., 2.60 to 2.90, ex dock, N.Y.
Easy Bleaching, impt., 2.05c to 2.15c, ex dock, N.Y.
Unbleached sulphate, impt., 1.80c to 2.05c ex dock N.Y.
Bleached sulphate, impt., 2.75c to 2.90c, ex dock, N.Y.
Kraft Pulp, 1.80c to 1.95c, ex dock, New York.

Paper.

News, rolls, transient business, 2.10c to 2.15c, f.o.b.
News, rolls, contract renewals, 2c to 2.10c, f.o.b.
News, side runs, 2c to 2.05c, f.o.b. New York.
News, sheets, 2.20c to 2.35c,f.o.b. New York.
Book papers, car lots, S. & S.C., $4 to $4.50, f.o.b.
Writing paper, extra superfine, 13½c to 17c, del. east of Miss. River.
Writing paper, superfine, 11c to 13c, del. east Miss R.
Writing paper, No. 1, fine, 9c, del east Miss. River.
Writing paper, No. 2, fine, 8c del. east Miss River.
Writing paper, engine sized, 5c to 8c, east Miss. R.
Bond paper, 5c to 24c, delivered east of Miss. R.
Ledger paper,5c to 25c, delivered east of Miss. R.
Linen paper, 8c to 18c, delivered east of Miss. River.
Manila jute, 4¾c to 5c, delivered.
Manila, wood, 2.30 to 3c, delivered.
Kraft, No. 1, (dom.) $3.60 to $3.75, f.o.b. New York.
Kraft, No. 2, (dom.) $3.35 to $3.50, f.o.b. New York.
Boxboards, news, $23 to $26 per ton, delivered
Wood pulp board, $40 to $42.50 per ton, delivered
Boxboards, straw, $21 to $24 per ton, delivered
Boxboards, chip, $22 to $25 per ton, delivered
Tissue, fourdrinier, 50c f.o.b. New York.
Tissue, white, cylinder, 40c to 42½c, f.o.b. New York.
Kraft, imported, 3.95c to 4c, ex dock, New York

THE BRITISH MARKETS

(Special to Pulp and Paper Magazine.)

The British paper industry in domestic circles is enjoying a good steady demand for all classes of paper, but the export trade is still upset by the high freights and the shortage of tonnage at the various ports. One of the great difficulties facing the British mill owner is to get his finished product away from the mill. Railways are blocked by war munitions and troops, and there is also scarcity of railway labor to handle goods. Motor haulage in the circumstances is the only resort and this cannot be adopted by all the mills, many of which are not in a position, geographically, to reach the consuming markets easily or the ports of shipment. Indeed, some of the mills find a difficulty in persuading the railway companies to remove goods within two weeks, and there is one instance of a paper maker being able to transport only 20 tons per week out of an output of 200 tons, most of which is sent away regularly into consuming channels. Added to the railway and shipping difficulties is a shortage in skilled labor and general labor. Men are wanted for to augment the troops in France and the paper mills are naturally recruiting grounds, with the result that unskilled labor hampers the output. Again, paper production is on an unprecedented higher level as regard cost, so that in many cases the seller is trying to recoup himself as best he can when dealing with the buyer. German, Austrian, Belgian and a good deal of the French makes of papers are completely out of the British Market, and buyers who do not patronize the home mills are confined to Scandinavian and United States productions. The Scandinavians, who are also experiencing high costs in production, are charging higher prices for their papers. Their greaseproofs, sulphite, bag papers, tissues and printing papers are all up considerably in quotations, some grades being $25 and $15 per ton extra when compared with this time last year. It is reported that all the Norwegian mills are well booked up with orders, but the difficulty is to get the paper to England and Scotland. Italian representatives have also been visiting London to pick up what they can. Norwegian glazed greaseproof mills are kept constantly busy with English orders, because they have captured what the Germans might have had. The British newsprint mills keep on a steady output, but the esparto paper mills are still on short time. It may truly be said that since the war broke out its effects have never been so severely felt as they have during the past two months, or since Germany started the nefarious scheme of sinking merchant vessels trading off the English coast. The German submarines run out like rats from their hole and pounce on a merchant vessel the moment they are out of sight of a British naval patrol boat. As a result, the export trade suffers from innumerable difficulties.

* * *

In the ground wood market a good deal of business has been done lately at high prices for prompt delivery. Shipments from Canada and Newfoundland have not yet commenced, so that most of the dealings were confined to Norway and Sweden. Swedish stocks are now said to be low. Norwegians, owing to the coal prices, have hardened their quotations. Sulphite and sulphate still keep dull and very little new business is doing. Prices, however, are firm. Stocks at all the British mills are plentiful, so that mill owners can afford to wait notwithstanding the temptations held out at present by the Scandinavians. Canadians who have pulp to spare might give the British market a little attention now—that is if a reasonable tariff can be fixed up with the shipping companies. Prices are nominally as follows, c.i.f. British ports:—

Bleached Sulphite, $61.00 to $67.50.
Sulphite Easy Bleaching, $48.00 to $49.40.
Sulphite, News, $42.00 to $47.40.
Unbleached Soda (No. 1), $45 to $47.
Soda Kraft, $40.50 to $42.
Ground Wood (50 per cent moist), $13.20 to $13.60.
Ground Wood (dry), $26 to $26.40.

* * *

The chemical market has been disturbed by labor unrest. Stocks of caustic soda are on a low scale, and prices are dearer. Oxalic acid is now 24 cents per pound, other acids are also scarce. Bleaching powder remains unchanged. Alum is dearer by $1.20, and [illegible] in request. Sulphur is steady.

* * *

China Clay is active, but the export trade is still hampered. Bauxite and French Chalk, owing to high freights are very dear—indeed, bauxite is now scarce. Large discoveries of French chalk or talc, have been made in South Africa and some of it is now reaching London.

STUDIES IN THE GRINDING OF SPRUCE.

An interesting and informing summary of J. H. Thickens's work on conditions influencing the yield of pulp in the grinding of spruce is given in a recent issue of the "Journal of the Society of Chemical Industry,"' quoted by "Paper":—

It is noted that the co-efficient of friction between the stone and the wood varies according to the nature of the wood, being lower for steamed than for raw wood; it decreases gradually as the pressure of grinding is raised. In industrial practice the wood is nearly always seasoned for a long period before grinding, but in addition to appreciable loss by rotting the pulp prepared from seasoned wood is shorter in fibre than that from green wood; steaming the wood before grinding gives longer fibres and stronger pulps, but darkens the color. At low pressure of grinding the consumption of power per ton of pulp is higher for seasoned than for steamed wood, while at high pressures the reverse is the case.

For green wood the power consumption per ton is lower than for either seasoned or steamed wood. The power supplied to the grinder under like conditions of speed and pressure is the same for green as for seasoned wood, but it is less for steamed wood. The rate of production of pulp from green wood is more rapid than from seasoned or steamed wood.

The yield of pulp per 100 cu. ft. of solid wood of various species is directly proportional to the dry weight per cu. ft. It is approximately the same for seasoned wood owing to decay. The yield of pulp from steamed wood is considerably lower, owing to decomposition and solvent action, and it falls as the severity of the treatment is increased. The quality of the pulp is not greatly influenced by the moisture in the wood or the weight per cu. ft. With wood of rapid growth the yield per 100 cu. ft. is lower and the pulp is softer than with slow-grown wood, but the strength is practically the same.

Some valuable manufacturing data are obtained by comparing the power consumption per ton per unit of strength; the efficiency in this respect reaches a maximum and then decreases. The yield of pulp from trimmed wood is 88 per cent by weight; the balance lost is divided between the screenings and the waste.

PAPER MANUFACTURES DEARER IN AUSTRIA.

According to the official report of the Austrian Paper Dealers' Association, in addition to the advance in paper the rise in other elements of manufacture has caused an increase of values. Further difficulties are caused by questions of transportation and exchange, which notably affect the importation of manufactures.

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Pulp and Paper Magazine

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VOL. XIII. MONTREAL, MAY 15, 1915 No. 10

No Election

There is welcome news from our Ottawa correspondent. He learns on good authority that the Dominion Election, which had been proposed by certain sections of politicians, has been abandoned, and that there will be no election for the present at least. Doubtless, the same influences in political ranks will endeavor to foment an election some time in the Fall, but it is sincerely to be hoped that the same vigorous public opinion that has been the one obstacle in the way of an appeal to the people at the present time, will again stand firmly in the path of any such project.

We Canadians have plenty to do in keeping our heads cool, and our industries moving, without any such impediment as would surely result from the politicians' proposals.

Our Pulpwood Supply

The official statement of the Temiskaming and Northern Ontario Railway Commission, shows that the total shipments of lumber, logs, pulpwood and other forest products, way-billed from the various stations for the five months ending March 31st, total [illegible] carloads. In this period there were shipped to their respective destinations 72,[illegible] cords of pulpwood, making 4,903 carloads. This is a total in excess of the shipments for the whole of last year. J. L. Englehart, Chairman of the Commission, states that 36,000 cords in addition to the 72,[illegible] cords [illegible] and that 19,000 cords are [illegible] that will be sold and shipped during the course of the year. Coming from such an authority, the statement that only 19,000 cords remain to be sold in the territory served by the T. & N. O., will be welcomed by the people of the Dominion.

It was feared not long ago, that there might be considerable difficulty over the condition of the settler. As is well known, the state of the pulp market is none too brisk, and pulpwood is almost a drug. The T. & N. O. Railway Commission did great service for the north country in establishing rossing plants in various sections of their territory, and in offering to advance the settlers money on their pulpwood if they should require it. In this connection Mr. Englehart recently said:—

"The important thing is, that it gave the settlers confidence. They knew that they could get money for their work, even if buyers were not plentiful. As a matter of fact, with the markets we have been able to find for the settlers, it has not been necessary for them to secure loans to any extent."

One difficulty which has stood in the way of the sale of pulpwood, is that pulp manufacturers naturally are not anxious to take pulpwood off the hands of the settlers while it is green, and the product of the woods operations this winter will very naturally have to stand until into the summer time in order that the wood may dry out. Rossing is, of course, necessary, as the [illegible] to the pulp manufacturer.

The problems of Northern Ontario are by no means solved. It will be necessary for the Ontario Government to add to the excellent work which it has been doing in the way of permitting settlers to export pulp wood when many are in need, and when the condition of the woods made necessary the removal of dead and down timber. The Government should put into force regulations which will cut down fire losses. It may be desirable to curtail the emigration into the north country for the reason that when there is too much pulpwood, and not a large enough market, the tendency to make light of forest fires is altogether too pronounced. Undoubtedly it is a matter for cold calculation whether the pulpwood crops are worth the saving. Some authorities will doubtless suggest that there is no necessity for keeping the timber when farm crops may be raised, and that this is the opinion of many in the North may be judged from the frequency of forest fires around the settlers' clearings. The Government should make up its mind whether it wants the timber saved or not, and apply drastic measures to carry out its policy. We would submit that it is a very short-sighted plan to develop agriculture in timbered areas, when so much untimbered land is available in the Dominion. It has been stated on good authority that only one-tenth of the arable land in the Canadian West is cultivated, and in Ontario there are many thousands of acres not now tilled, which can be put under cultivation with far less effort than is involved in clearing the Clay Belt. The North country should be developed, and all Canadians look for great results from it, but to allow good timber to be burned, or what is worse, to allow a general carelessness as to its fate to gain ground, is a very dangerous and costly policy.

Canada may have great forest wealth, but when pulp manufacturers in several localities are so fearful of the future as to be making commercial plantations, we can well afford to conserve the wealth which now exists. We would congratulate the Ontario Government and the T. and N. O. Commission upon what they have done in fire protection and in developing forest resources, but would suggest that future settlement of the North be carried on with the fact in view that the agricultural possibilities of the North will not be impaired by the careful husbanding of the forests which now stand there.

More Co-operation Needed

It is to be regretted that the meeting of the Papermakers' Safety Association, called at Ottawa on the 11th inst, was not better attended. There was not a broad enough representation to justify the provisional directors in going ahead with the adoption of the by-laws which they had drawn up. It was decided to adjourn to another meeting to be held in Toronto before the end of the month. It is earnestly hoped that the manufacturers of the Province will see fit to attend this meeting in large numbers.

We understand that the assessment of the Workmen's Compensation Board on Pulp and Paper Mills is 1.4 per cent of the annual pay roll. This would bring into the compensation fund a sum considerably in excess of $50,000.00 a year. That is to say, in the pulp and paper industry in Ontario alone employers have to provide a guarantee of this amount to defray the expense of accidents due to the lack of precaution on the part of the employers.

We believe that the Act, in placing responsibility to this extent upon the employer of labor, is taking absolutely the right course. We understand that the workman pays his contribution to defray the losses which naturally go with accidents, in the form of bills to the doctor who attends him. Naturally, if an injury is not of sufficient seriousness to warrant compensation under the Act, then the workman has paid something toward the general mass of accidents without receiving any return, except that of his normal health and ability.

The Safety Association is provided for in the Act in order to encourage co-operation among manufacturers in reducing losses. If by employing inspectors, and putting into operation safety regulations and appliances, they can demonstrate to the Board it is not necessary for them to contribute as much as the Board now asks, it is expected that their contribution to the Compensation Fund will be reduced. A movement is on foot to secure the fixation of the assessment at the end of each year, when the necessary compensation has been determined. This is an excellent move, as it will afford a great deal of encouragement to the manufacturers to see their assessment reduced year by year, if their efforts are successful.

While the Act provides that if 60 per cent of the firms in any class of industry should co-operate to form an Association, they can force the other 40 per cent to be amenable to the regulations which they themselves decide upon, it is more to be desired that there should be at once an enthusiastic joining of forces to the end of reducing losses. Lack of co-operation will cost the pulp and paper manufacturers money, for the simple reason that the Board has placed the assessment on a level which practically every manufacturer considers too high as compared with the losses. Co-operation, on the other hand, will tend to reduce accidents, and to bring about in the mills greater efficiency and a more wholesome spirit among employees. Therefore, the manufacturers by responding quickly to the demands of the moment will earn the respect of all the men who work with them. They should not allow the impression that the law is forcing them into this move, to get abroad, but should show that they are glad to take advantage of an opportunity to do good to themselves and to their workmen.

The Pulp and Paper Magazine urges every mill in Ontario to send a representative to the meeting of the Papermakers' Safety Association in Toronto, when it is called.

THE COMPUTATION OF BOILER VOLUMES

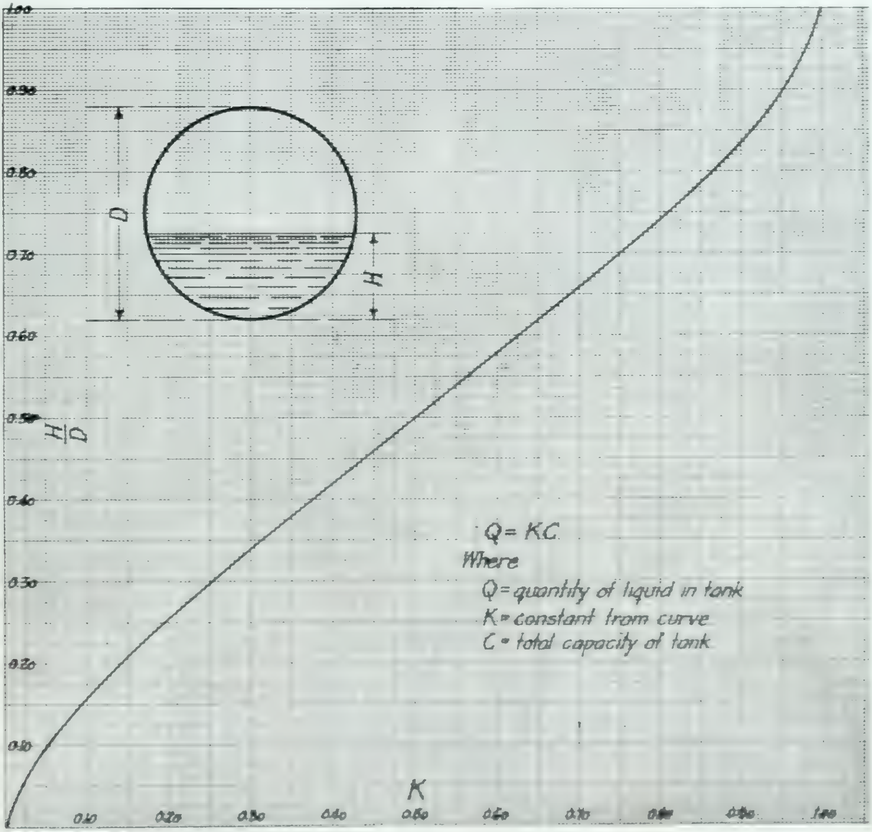
Mr. R. De L. French of the firm of R. S. and W. S. Lea, Consulting Engineers, Montreal, has written some interesting comments on a technical article recently appearing in these columns. He says:

In your issue of April 15th last, you abstract an article from Chemical Trade Journal relative to "The Computation of Boiler Volumes." The writer has read this article with a great deal of care, but has been unable to ascertain why the peculiar formula used was chosen, as a simpler form would apparently do equally well.

The enclosed curve has been plotted, using the same symbols as given in the article referred to. Its method of use will be apparent on a cursory examination. Taking the same example as that given in your article, we have:

C, the total capacity = 1,000 gallons.
D, the internal diameter = 3 feet.
H, the depth of liquid in the tank = 10 inches.

Therefore $H/D = 10/36 = 0.277$. From the curve, for this value of H/D $K = 0.226$ and $Q = KC = 0.226 \times 1{,}000 = 226$ gallons.



With this curve there are no signs to be remembered, as with the one you give. Furthermore, it can be accurately plotted by using the familiar tables of circular segments given in the various engineering handbooks —Trautwine, Kent, American Civil Engineers, Frye, the etc.

The Provincial Paper Mills, Company, Limited, who have plants at Mille Roches, Thorold, and Georgetown, Ont., are now shipping book papers to Buenos Aires, South America. During the past month a car load has been exported every week and it is believed that the market will be further extended.

MEASURING THE MOISTURE IN CELLULOSE

By OTTO NORDSTROM.

The fact that absolutely dry pulp is not a conductor of electricity, contrary to moist pulp, which is a good transmitter of the electric current, is made the basis of an apparatus for automatically measuring the amount of moisture in cellulose. The water contained in the pulp, or more correctly, the salts and acids in this water, are the real transmitters of the current. This water would always possess the same conducting power, if it remained always of the same constitution, that is, always contained the same quantities of salts and acids and maintained the same temperature. The proportion would remain the same, if a portion of the cellulose, having a constant percentage of moisture, was closely connected with live contracts and the transmitting power was measured; that is to say, in all cases where the cellulose contained the same quality and quantity of moisture, if an electric current of unvarying voltage was conducted through the cellulose, an electrical measuring instrument would show the same reading.

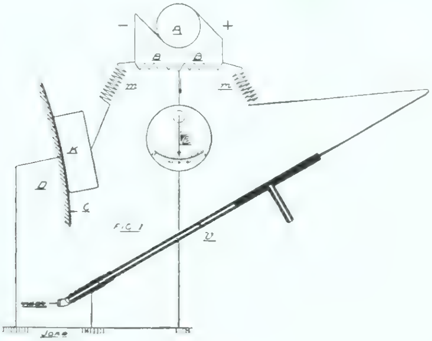


Fig. 1.

Such a condition, however, seldom prevails. The volume of salts and acids in pulp water varies greatly, especially in mills located at the mouth of a river, near the sea. At Ortviken, for example, the amount of salt in the water ranges between 1 and 70 German hardness degrees, and, here, the degree of hardness rarely declined to 1, though regularly every winter it went down to 5. The conductivity of the water changes about in proportion to the salts it contains, and we can, therefore understand why the deflection of the instrument, in cases where the amount of salt in the pulp water reaches 70 degrees of hardness, is about fourteen times greater than when the volume of salt it contains is equivalent to only 5 degrees hardness, even if the cellulose, in both instances, contains the same percentage of water.

In order to read the amount of moisture in cellulose directly on an electrical measuring instrument, independent of the varying amount of salts it contains, a compensating arrangement is made use of which we shall here describe.

In what are known as "fresh-water" mills, it always has to be taken into consideration that the pulp is in many instances not uniformly washed, and that consequently more or less acids or lye are retained in it. It cannot be considered that the quantity of salt will remain uniform throughout the year, and for this reason the compensating arrangement is indispensable.

The temperature of the pulp water on the drying cylinder is at the same time not always constant, even when the cylinder is protected at the point where the measurements are made.

In order to convey an intelligent idea of such a moisture measurer, an illustration of it, in plan, is presented. A indicates the source of current; B and B' two constant and equally large resistances, while m and m' are two variable but equally large resistances; K indicates the contacts, C the lap of pulp, D the cylinder, and E the measuring instrument; v is the compensating arrangement, consisting of a glass tube, through which water from the wet end of the last press may flow.

Through the upper end of the tube in the compensating device, a contact is introduced and this can be shifted to any point in the tube, that is to say, the height of the column of water through which the current must pass can be lowered or raised at will. The lower end of the glass pipe is grounded by means of a metal tube.

The arrangement is based on the principle of the Wheatstone bridge. When the sum of the resistances B, m and the water resistance in the tube v equals the sum of the resistances B', m' and the resistance i of the pulp, no current passes through the measuring instrument, or milliamperometer E. A part of the current passes through the two equal resistances B and B' and back to the source of current A; while another goes through the resistance m and the water resistance in v to be grounded; then through the resistance at C, and at m', and so back to the source of current at A.

The apparatus is so regulated, that is, the contact of the compensating device is so shifted, that no current can pass through the measuring instrument if the pulp contains the required amount of water, as a general rule, 10 per cent. Supposing the measuring instrument to be set for pulp containing 10 per cent of water and the moisture in the pulp increase to, say, 12 per cent, the resistance in the pulp C is lessened. The sum of the resistances on this side of the measuring instrument is consequently reduced to less than the sum of the resistances on the other side and a portion of the current passes through the measuring instrument in the direction of the arrow, while the pointer of the instrument is deflected to one side.

If the pulp is too dry, containing, for example, only 8 per cent of water, the conditions will be reversed, the resistance in the cellulose being greater, and the sum of the resistances on this side in excess of the sum of the resistances on the other side of the measuring instrument. In this case, a current also passes through

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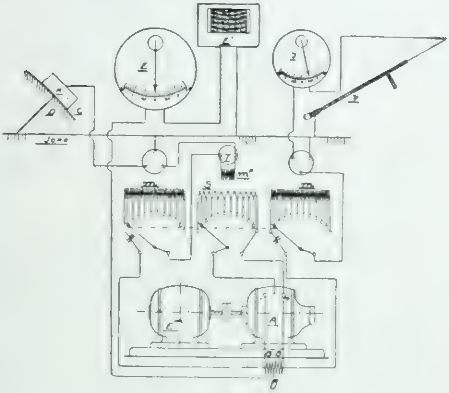
In an address delivered before the Swedish Association of Paper and Pulp Engineers on February 13, 1914. accompanying illustrations by courtesy of "Paper", in which the address appeared.

the instrument, but in the opposite direction to that noted in the previous instance, the deflection taking place in the opposite direction. According to the deflections of the instrument we are able to determine the amount of moisture contained in the pulp. When the conductivity of the water changes, the same change will occur simultaneously and to an equal extent in the pulp, as well as in the glass tube. The instrument will moreover register 0 when the pulp is 90 per cent, or contains 10 per cent of water. The apparatus may be described better by beginning with the source of current and following along its path.



Fog. 2.

For every apparatus a special source of current is required, the most common being a small dynamo with adjustable voltage. Storage batteries are too cumbersome. The regulation of the voltage of the generator is effected in the simplest manner, with the aid of a switch rheostat. By reference to Fig. 2 it will be seen that the dynamo A is operated by the motor Em. By manipulating the switch rheostat, twelve different voltages may be obtained for the dynamo.

To obtain the zero point for the connection of the measuring instrument to a contact, the resistances B and B' are provided. If we now proceed and follow the positive conductor we first arrive at the regulable resistance m and from there to a three-way switch with the aid of which the current can be interrupted, grounded or passed to the measuring instrument J, whence it passes through the compensating device v and subsequently to earth. The instrument J is an ordinary milliamperemeter registering to 1.5 milliamperes. The instrument registers directly the current passing through the water in the compensating device and by regulation of voltage and resistance its deflection is kept uniform.

The current is now ground, whence it passes to the drying cylinder D and through the sheet of pulp D to the contacts K. From these the current passes through another three-way switch with the aid of which the current can either be broken or grounded. By means of the circuit breaker T we can switch in or cut out what is known as the compensation resistance m', whence the current returns to the dynamo. Finally, at the zero point, between the contact B and B', the moisture measurer is switched in. This consists of an ordinary milliam Perometer E, similar to that already described, and a registering device E, which registers every minute on a strip of paper the deflection of the instrument. This strip is changed daily.

We will now return to the contacts K. These press on the pulp C and are disposed on a drying cylinder D. They are loaded with weights (Figs. 3 and 4) so that the bearing surface will always remain the same. With soft pulp the contact roll will of course have a larger bearing surface than with hard pulp, because the roller will in the first instance press more deeply into the material. The location of the place of contact K is of great importance. As it is only the resistance at the bearing surface of the rubbing contact which we have to consider, the contact on the other side of the pulp formed by the drying cylinder having a bearing surface of unlimited extent, it will be readily understood that a place must be selected where the moistness of the surface is about equivalent to the average moisture of the pulp.

At the point P (Fig. 3) where the lap of pulp has just passed over the upper heated roll the surface moisture will be much less than the average moisture of the sheet. For the same moisture on the surface this difference is greater where the pulp runs thick than where it is thin. The desired place we have found by experiment to be where the contacts are shown in the illustration as placed. The pulp must therefore be carried in a different direction to the usual way. The outer portion of the sheet of pulp, on which the measurements are taken, has here traversed a distance equal to twice the circumference of a cylinder without having been in direct contact with them.

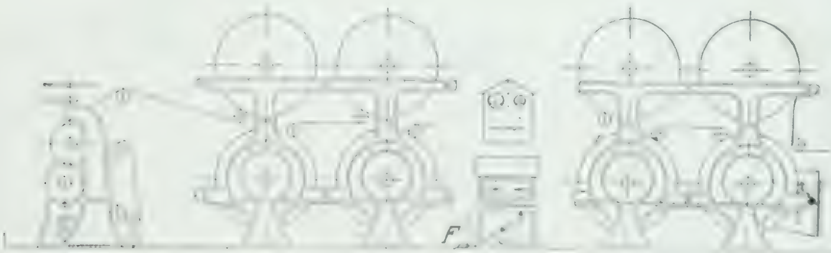


Fig 3.

As the tests have shown, the conductivity of the pulp increases with the increase in the quantity of salts it contains, and more rapidly than that of water in the glass tube. This is a result probably of the difference in temperature at the two points, and makes it necessary to install a constant resistance in series with the water. This compensating resistance is only employed, however, where the variations in the salt content are considerable. The resistance m and m' are regulatable, like the voltage of the dynamo A. The regulating arms of the three resistances are firmly connected together so that the three regulations may be effected at once. To protect it from variations in temperature, the part of the drying cylinder at which the moisture is measured is equipped with a sheet-metal hood (Fig. 3). To prevent the fibres, etc., from choking the glass tube it is equipped with a strainer F (Fig. 3).

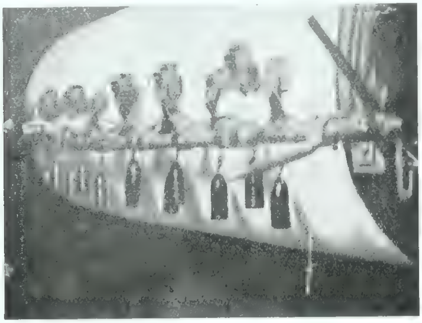


Fig. 4.

Although differences in the degree of moisture cannot possibly be avoided over the full width of the sheet of pulp, the apparatus will at least prove a valuable aid in preventing complaints.

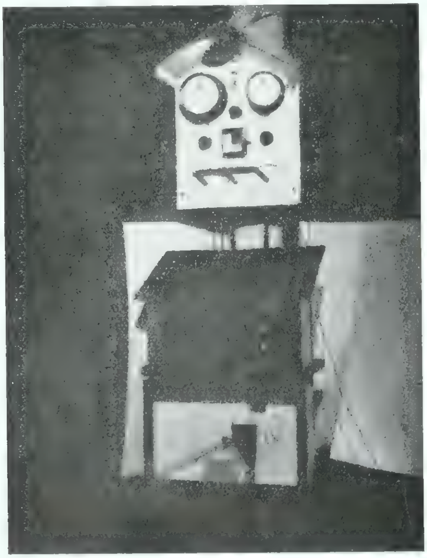


Fig. 5

Fig. 5 is a photograph of the entire apparatus with the exception of the contacts, K, which are shown in Fig. 4.

QUICK-RUNNING CALENDERS.

Although the rapid running of the calenders gives the appearance of making plenty of paper, it has its difficulties, especially as there is a tendency to run the calender faster than it was built for, is the opinion of the "Papier Zeitung," which says that this may be very well in the case of strong and elastic papers, and so long as they only pass through the calender. When, however, different sorts of papers, including weaker ones, are run alternately, and, of course, when it is a question of weak papers only, the speed must be reduced to correspond to the strength of the weakest paper. But it is practically impossible to keep on varying the speed for different sorts of paper, and the difficulty is accentuated by the fact that if the calender is run fast the pressure between rollers must be heavy, or else the web has not the time to receive the necessary gloss.

This heavy pressure makes the effects of any creases or inequalities of thickness in the paper absolutely permanent. Fast running is also not without its effect on the calender itself. The stress on the bearings makes them very likely to run hot under the heavy load, and great care is required in the lubrication, and that may even prove inadequate to prevent injury to the machine.

There is the further danger that the pressure may crush the paper so much as to affect the felting, and, therefore, the strength of the web. This is often manifested by a glassy look through, which it is impossible to attribute to any cause, whether imperfect sizing or otherwise, than can be alleged. If the calender is running at a high speed, and it is necessary to stop it quickly for any reason, it is difficult to do so, and the breaking strains the whole machine very severely.

It must be evident from what has now been said that a quick-running and slow-running calender should be provided, and that each should be restricted to the work which it is constructed to perform.

WANT CANADIAN PAPER.

Mr. J. E. Roy, Canadian Trade Commissioner in Great Britain, reports that investigations indicate that former sources of supply of paper are disturbed to such an extent that importers and merchants are desirous of getting in touch with manufacturers in Canada to assist in filling their requirements. These inquiries cover a large field so far as classes of paper are concerned, as follows:—

Blotting, book, carbon, catalogue, coated and enamelled, colored, corrugated, cover, drawing, envelope, featherweight, fibre, glazed, gummed, kraft, label, lithographic, news, tag, tissue, typewriter, waterproof, waxed, wrapping and manila, writing and ledger, kraft browns, grease-proofs, vegetable parchments, M.G. cap bag papers, M.G. sulphite papers in heavy weights, toilet.

Under the circumstances it would be advisable for Canadian firms in a position to compete in these goods to communicate with buyers. They will find that their samples and quotations will receive care and attention. Names and addresses of Glasgow inquirers are on file at the Department of Trade and Commerce, Ottawa. In making quotations it would be well to give full particulars regarding details of packing. Prices should be quoted in sterling, delivered at Glasgow.

COURSES OF INSTRUCTION IN PAPER MAKING IN BRITISH TECHNOLOGICAL INSTITUTE

Through the kindness of Mr. A. Temperley, whose article on "Paper Testing" appeared in the May 1st issue of Pulp and Paper Magazine, it is possible to reproduce here the courses of instruction in the Municipal School of Technology, Manchester, and in the Technical School at Bury, at which Mr. Temperley is lecturer in paper making. The general description of the former institute is from the pen of Mr. Olivier Rolland, whilst from the curricula of the two institutes are taken the details of the courses.

THE MUNICIPAL SCHOOL OF TECHNOLOGY, MANCHESTER.

This institution is designed to give courses in: Mechanical Engineering; Electrical Engineering; Municipal and Sanitary Engineering; Architecture and the Building Trades. The Chemical Industries, including:—(a) General Chemical Technology; (b) The Chemistry of Textiles; (c) Paper Manufacture; (d) Metallurgy and Assaying; (e) Brewing, Photography, etc.

After an attendance of three years in any of the above named branches, the student, who has passed the examinations satisfactorily, is graduated with the title of Bachelor of Technical Science (B.Sc. Tech).

The school cost [illegible]. It is a splendid building, of the French Renaissance style of architecture.

The laboratories are so vast and so well equipped that they can be compared with those of the great universities, as, for instance, McGill.

The head of the Paper Manufacturing Department is Mr. Y. Hubner.

The Paper Makers' course is as follows:

FIRST YEAR COURSE.

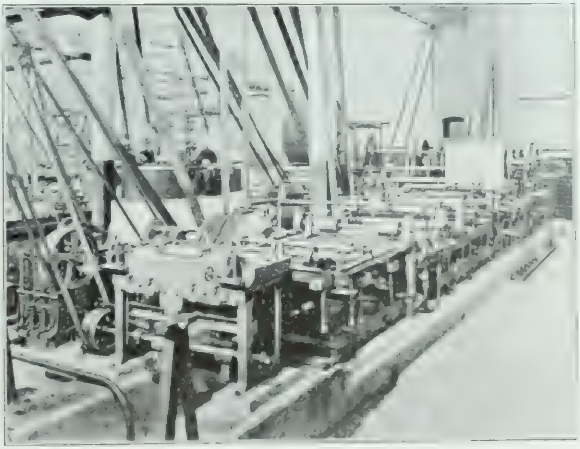
Chemistry of the Non Metals.—3 hours a week. Preparation and properties of the halogens and their principal compounds. Laws of chemical combination; atoms and molecules. Avogadro's theory; methods of determining atomic and molecular weights; dissociation; classification of elements; the periodic law. Methods for determining the composition of air and water. Hydrogen peroxide; ozone. Boron and silicon and their compounds; glass and porcelain. Phosphorus, arsenic, antimony, and bismuth, and their chief compounds.

Inorganic Chemistry (Laboratory). — 1½ hours a week. Study of the properties and compounds of the halogens and the phosphorus groups of elements. Determination of equivalents of elements. Simple analysis.

Mathematics.—Two hours a week. Methods of approximate calculation, arithmetical, logarithmic, and slide rule; application to mensuration of plane figures and soldis. Trigonometrical functions; solution in right-angled triangles. Factors; algebraic fractions; simple and quadratic equations; problems; easy indices and surds. Plotting of algebraic functions; easy cases of graphic solution of equation; the law [illegible] be obtained from plotted results of experiments.

Physics for Chemists (Lectures).—One hour a week. Units and measurements; the physical balance; density, capillarity, osmotic properties of solutions; physical properties of gases. Light: index of refraction; the spectrometer; the spectroscope; the microscope; polarisation of light. Heat; temperature measurements; calorimetry; vapour pressure; hygrometry; radiant heat. Electricity: units; Ohm's law; electro-chemistry; electro magnetism; electrical measurements; thermo-electricity.

Physics for Chemists (Laboratory).—One and a half hours a week. Testing of the physical balance; calibration of measuring instruments; determination of



Paper Machine—Manchester School of Technology.

density; surface tension; viscosity; thermometry; pyrometry; calorimetry; expansion by heat; melting points; boiling points; hygrometry; optical measurements; use of the spectrometer and spectroscope; polarisation of light; electrical measurements; electro-chemical experiments and measurements.

SECOND YEAR COURSE.

Chemistry of the Metals (Lectures).—One hour a week. General properties of the metals. Methods of extraction and principal properties of the more important metals. Preparation, properties, and uses of their chief compounds. Introduction to the study of thermo-chemistry and electrolysis.

Inorganic Chemistry (Laboratory).—One and a half hours a week. The qualitative analysis of simple salts and mixtures. Volumetric analysis.

Organic Chemistry 1: Aliphatic Series (Lectures).—One hour a week. The hydrocarbons of the fatty or aliphatic series and their derivatives.

Organic Chemistry (Laboratory).—Two and a half hours a week. Practical work in connection with the lecture course.

THIRD YEAR COURSE.

Technology of Paper Making (Lecture).—One and a half hours a week. Raw and manufactured fibre-yielding substances; microscopical and chemical characteristics of the fibres; cellulose; rags and their chemical and mechanical treatment; boiling processes; breaking and beating engines. Bleaching processes; antichlors; nature and application of loading agents; determination of ash. Sizing and sizing materials; determination of the presence or absence of the various sizing agents in the finished product; effect of acid on the pulp; and means of detection; toning, coloring and mottling; mordants and coloring matters used in dyeing and staining; nature of coloring matters; application, fastness to light; chemical reactions for detecting coloring matters in the finished paper; hand process; paper machines and the appliances connected with them; calandering and cutting; various classes of paper; paper testing; utilization of waste products; soda recovery; processes for the preparation of wood pulp.

Organic Chemistry, 11; Aromatic Series (Lectures). One hour a week. Classification of carbon compounds into open chain and cyclic compounds. Constitutional differences between the various classes The hydrocarbons of the alicyclic series and their derivatives.

Organic Chemistry (Laboratory).—One and a half hours. The reactions of some of the more important and commonly occurring organic compounds. The preparation of selected examples of compounds belonging to the aromatic series.

Paper-Making Laboratory.—6 hours. Practical work based upon the lectures of the third year.

Mechanics (Lecture).—One hour. Graphic representation of forces and velocities; diagrams of work; moments and couples; levers; simple machines illustrating mechanical advantage; velocity ratio and efficiency; the laws of friction; lubrication; transmission of power by shafting, wheel gearing, pulleys, belts, and ropes; laws of motion; angular velocity; acceleration; kinetic and petential energy; centrifugal force; impulse and momentum; elementary hydrostatics; laws of fluid pressure; accumulators; packing presses.

Mechanics Laboratory.—One and a half hours. Triangle and polygon of forces; moments; sliding friction; belt friction; test of a simple machine for velocity ratio; mechanical advantage, and efficiency; energy in a flywheel.

Heat Engines (Lectures).—One hour. Unit of heat; sensible and latent heat; total heat of evaporation; standard of evaporation; evaporative power of fuels; volume, pressure, and temperature of saturated steam; Joule's equivalent of heat and work. Steam pressure indicators and indicator diagrams; generation of steam; types of steam boilers; modern steam engines; slide valve and steam distribution; compound engines; Corliss engine; indicated horse power; brake horsepower and mechanical efficiency; economisers; superheaters; condensers; principles of the steam turbine; types of turbines in use. Gas engine; suction gas plant. Oil engines.

Heat Engines Laboratory.—One and a half hours. Tests for the calorific value of boiler and gas engine fuels; condenser tests; tests of indicators; tests of steam, gas, and oil engines.

FIFTH YEAR COURSE.

Paper Manufacture.—Six hours. Practical work complementary to the third year lectures; testing of raw materials, paper testing, and research on an industrial scale.

Chemical Laboratory.—One and a half hours. General analytical chemistry with special reference to the requirements of paper manufacturers.

General Chemical Technology.—Text Books Recommended.

FIRST YEAR COURSE:
- Inorganic Chemistry (Laboratory) Students, Chemistry, Taylor. 3s 9d.
- Mathematics 1.—Elementary Algebra, Hall & Knight, 3s 5d.—Slide Rule, 7s 6d.
- Physics for Chemists (Lectures).—Class Book of Physics, Gregory & Hadley, 3s 5d.

SECOND YEAR COURSE:
- Chemistry of the Metals (Lectures).—Students Chemistry, Taylor. 3s 9d.

THIRD YEAR COURSE:
- Organic Chemistry, 11; Lectures—Organic Chemistry, Parts 1 and 2, Perkin & Kipping, 5s 8d; Practical Organic Chemistry, Radcliffe & Sinnatt, 3s 9d.

FOURTH YEAR COURSE:
- Mechanics (Lectures)—Applied Mechanics, Cryer & Jordan. 2s 3d.

TECHNICAL SCHOOL AND SCHOOL OF ART AT BURY, LANCS.

This institution has been established by the Union of Lancashire and Cheshire Institutes, with the object of supplying the necessary knowledge to enable a student to prosecute with success the study of any trade or science subject, and students who pass the Union's examination held at the close of the Session are thereafter eligible for admission to classes preparing for the examinations of the City and Guilds of London Institute, or of the Board of Education.

Students are eligible to compete for various Scholarships, Exhibitions and Prizes offered by the Board of Education. These include four Whitworth Scholarships of £125 a year, tenable for three years, and thirty £50 Exhibitions, tenable for one year; also a number of Royal Exhibitions, Scholarships and Free Studentships, etc., etc. Scholarships, Medals, and Prizes are also warded by the City and Guilds of London Institute, and by the Union of Lancashire and Cheshire Institutes, Buty Corporation, Victoria University of Manchester, etc., etc.

The Institution is designed to give courses in:—Preliminary Technical course; Pure and Applied Chemistry; Engineering; Building Trades; Textile Manufacture; Commercial Subjects; Domestic Science Subjects; General Science Subjects, etc.

The following announcement which was distributed among the mills is an indication of what this school is doing for British Papermakers:—

Please Post Up in Mill or Office.

PAPER MANUFACTURE.

Two classes in the above subject will be held in the Technical School, Bury, on Friday evenings, 8 to 9.30 (Ordinary Grade); Saturday Afternoons 4 to 5.30 (Advanced and Honors Grades); Commencing Friday and Saturday, September 25th and 26th, 1914.

Fee for the Session, 7s 6d. Lecturer, Mr. A. Temperley (First-Class Honors).

The Course of Lectures and Practical Work has been arranged to enable workmen and students to acquire a good knowledge of the various operations and machinery employed in the important industry of Paper-making. The subjects treated will include Fibres, Preparatory Processes, viz.: Boiling, Washing, Bleaching, Sizing, Loading and Coloring, etc. The Beating, Machine and Finishing Operations and Appliances. The Site, Motive power, and Mechanical Arrangements of Modern Mills.

The Lectures will be illustrated by means of lantern Slides, Models, Drawings, Samples, and Experiments of an interesting and practical character.

At the end of the Session visits will be paid to local Mills or the Works of Paper Mill Engineers.

The samples of paper include an extensive and valuable collection of high-class British, American, and Continental Makes and Specialties. These are available for Students' Examination and Testing.

Practical Work consists of Boiling, Bleaching, and Dyeing Experiments, the data and results of which have often been turned to practical account in the mill; Production of Hand-made Sheets and Colored Patterns of Special Dye Stuffs; Examination and Methods of Paper Testing; also all Materials, Chemicals, Fuel and Water used in Papermaking; Systems of Paper Mill Accounts and Costing will be dealt with.

For further particulars of Lectures, Prizes, and the Special Organized Course, intending Students are recommended to apply early at the School for a Directory of the Classes. Students enrolling their names the previous week to above date are exempt from the Registration Fee of Sixpence.

The courses in Paper Manufacture are as follows:—

FIRST YEAR COURSE.

Inorganic Chemistry.—Lecture one hour; practical one and a half hours.

Lecture: Chemical and physical changes. Properties of gases, oxygen, hydrogen, water. Laws of chemical combination; mixtures and compounds; chlorine and hydrochloric acid; carbon and its oxides; sulphur; compounds of sulphur with hydrogen and oxygen, nitrogen and its compounds, acids, bases, and salts.

Laboratory Practice: The preparation of the subjects of the Lecture Course. General chemical operations. Quantitative exercises.

Practical Mathematics.—Two hours. Arithmetic: Degrees of accuracy. Time saving devices. Rough check. Contracted methods. Square root. Averages. Percentages. British and Metric Measures.

Formulae and Equations: Formation and use of formulae. Transformation of formulae so as to express each quantity in terms of the others. Evaluation of any quantity in formulae when the values of the other quantities are given. Formulae involving plus and minus signs in addition to the multiplication and division signs. Solution of simple equations. Simultaneous simple equations. Problems leading to simple equations.

Factors and Fractions: Multiplication of binomials by inspection. Taking out a common factor. Difference of two squares. Simple algebraic fractions. Cancelling out common factors. Addition and substraction of simple algebraic fractions.

Indices and Logarithms: Powers and roots. Roots expressed as indices. Laws of indices. Logarithms. Antilogarithms. Use of tables of logarithms. Evaluation of formulae by means of logarithms.

Mensuration: Perimeters and areas of:—Parallelogram, triangle, trapezium, polygon, circle, annulus, sector of circle, segment of circle, and ellipse, with practical applications. Plotting of figures bounded by curves and determination of their areas by (a) counting squares, (b) mid-ordinate rule. Surfaces. Volumes. Weights of prism, cylinder, pyramid, cone, sphere, with practical applications.

Proportion and Variation: Simple proportion treated as the equility of two ratios. Direct variation. Inverse variation. Joint variation.

Geometry: The most important propositions of Euclid: Books I, II, III, and VI., illustrated by drawing and measurement.

Graps: Rectangular co-ordinates. Plotting of rectilineal and curved figures. Importance of choice of scales. Plotting of experimental data. Correction of errors of observation. Interpolation. Simple algebraic graphs. Graphical solution of simple and simultaneous equations.

Trigonometry: Measurement of angular displacement. Trigonometrical ratios of angles not greater than 90 deg. Simple relations connecting the trigonometrical ratios. Use of tables of sines, cosines, and tangents. Solution of right-angled triangles.

General Physics.—Two and a quarter hours. Lecture and Laboratory Practice:

General: Units of length, area, volume, mass; density and specific gravity.

Heat: Nature of heat. Thermometry; effects of heat on solids, liquids and gases; melting points and boiling points, effect of impurities and change of pressure; the physical laws relating to gases; units of heat; specific heat; latent heat; conduction, convection and radiation.

Magnetism and Electricity: Magnets, voltaic cells, resistance, thermal effects of currents, electrolysis, quantitative laws.

Light: Nature of light, reflection, refraction and elementary ideas of spectra and spectroscope; polarisation.

SECOND YEAR COURSE.

Inorganic Chemistry: (The work of this stage is divided into two sections, taken in alternate years. Lecture, One hour; Practical, Two hours.

Lectures: Section A.—Methods for determination of composition of gases. Laws of gaseous combination. Atomic theory and its applications. Valency; dissociation; classification of the elements. Water, hydrogen. dioxide, ozone, air. The halogen elements and simple compounds. Phosphorus group. Sulphur group. Boron, silicon, carbon Section B.—Study of the Periodic System. Chief properties and compounds of the principal group of metals, with special reference to such important substances as bleaching powder, alkali, etc.

Laboratory Practice: Qualitative analysis. Inorganic preparations. Introduction to quantitative analysis.

Organic Chemistry.—Lecture, one hour; practical, two hours.

Lectures: Saturated and unsaturated hydrocarbons. Halides. Alcohols, aldehydes and ketones. Acids and esters. Carbohydrates. Amines. Benzene. Nitrobenzene and aniline. Homologues of benzene. Phenols. Benzoic acid.

Laboratory Practice: Qualitative analysis and preparation of organic compounds.

Paper Manufacture.—One and a half hours.

1. Fibre yielding raw materials. Chemical and structural features. Celluloses and compound celluloses.

2. Mechanical preparing processes. Sorting, picking, cutting and dusting.

3. Boiling processes. (a) Alkaline treatments. Theory of action. The various types of boilers or digesters for rags, esparto, straw, wood. (b) Acid processes. The bisulphite system of wood treatment. (c) Treatment of waste papers, "broke," and air dry pulps.

4. Washing processes. Special methods directed to economical recovery of chemicals. Breaking engine: construction and working.

5. Bleaching processes. Chemistry of hypochlorites and their action; electrolytic processes of production. The variations of bleaching methods commonly practised. Auxiliary agents and their effects. Conditions affecting economy of process and permanence of bleaching effects.

6. Beating processes. Construction and working of beaters. The factors of the treatment considered in relation (a) to the working of the pulp on the machine. (b) to the construction and mechanical properties of the finished web of paper.

Engine sizing. Rosin size: preparation and composition. Starch casein. Alum and sulphate of alumina. Loading and coloring. Tub sizing. Preparation of gelatine size.

8. The Paper Machine and its adjuncts. Stuffchests, strainers, sand tables, the wire, couch and press rolls, felts, drying cylinders. Adjustments of speed. Backwater. Effects of rapid and slow drying. Water marking. The handmaking process. "Board" processes.

9. Calenders. Appliances for damping. Effects of calendering upon the mechanical properties of the paper. Plate glazing.

10. Treatment and utilization of waste products and spent liquors. Soda recovery. Principles of multiple effect evaporation.

11. The various classes of paper in relation to composition and trade uses. Sizes and weights.

12. The Laboratory. Methods of sampling for analysis. Qualitative examination of papers to determine composition, pulp, sizing, loading. Estimates of moisture and ash. Determination of specific, gravities by weighing and by hydrometers.

13. Laboratory Work. Methods of estimating cellulose. Valuation of raw fibrous materials. Chemical characteristics of celluloses and compounl celluloses. Test solutions and their preparation. Quantitative estimations of acids, alkalies, hypochlorites, sulphites, and bisulphites (sulphurous acid), sulphate of alumina. Comparative coloring powers of dyes and pigments. Chemical methods generally required for the routine of the mill.

THIRD YEAR COURSE.

Inorganic Chemistry.—Lecture, one hour; practical two hours.

Study of the Periodic System. Chief properties and compounds of the principal groups of metals, with special reference to such important substances as bleaching powder, alkali, etc.

Laboratory Practice. Qualitative analysis. Inorganic preparations. Introduction to quantitative analysis.

Organic Chemistry.—Lecture, one hour; practical, two hours.

Lectures: Saturated and unsaturated hydrocarbons. Halides. Alcohols, aldehydes and ketones. Acids and esters. Carbohydrates. Amines. Benzene. Nitrobenzene and aniline. Homologues of benzene. Phenols. Benzoic acid.

Laboratory Practice: Qualitative analysis and preparation of organic compounds.

Paper Manufacture.—One and a half hours.

The matter contained in Second Year Course, and in addition:—

1. The Mill: Site, general arrangement, water supply, desirable features in each. Treatment of waste waters.

2. Cost of production in relation to raw materials, labor, chemicals and steam.

3. Microscopic features of fibres in relation to paper making value; quantitative analysis of papers (pulps) by microscopic methods.

4. Mechanical properties of papers; quantitative measurements.

5. Special varieties of papers; blottings, vegetable parchments, imitation parchments, filtering papers, enamel papers, waxed papers, waterproof papers, "safety" cheque papers, drawing papers, photographic papers.

FOURTH YEAR COURSE.

Paper Manufacture.—(a) Practical, three hours. (b) Lecture, one and a half hours, and either (a) or (b):

(a) Inorganic Chemistry. Lecture, one hour; practical, two hours.

(b) Practical Dyeing, two and a half hours. Cotton and Linen Bleaching and Cotton Dyeing: Lecture, one and a half hours.

(a) **Inorganic Chemistry**:

Lectures: Compounds, metallic and non-metallic. Special attention to Physical Chemistry and to manufacturing processes.

Laboratory Practice: Qualitative, gravimetric, and volumetric analysis with general chemical work.

(b) **Practical Dyeing**:

This Course is arranged so as to give the students an opportunity of mordanting and dyeing for themselves, on either yarn or calico, with the various chemicals, mordants, dyes, etc., which are employed on a commercial scale.

The laboratory, which is equipped with modern apparatus, is supplied with the latest dyes and chemical products employed in dyeing.

Each student will be provided with the necessary dyeing and bleaching apparatus, dyes, chemicals, etc.

Arrangements have been made with the leading color manufacturers for a supply of the latest coloring matter as soon as put on the market, as well as pattern cards. Students will have an early opportunity of testing and valuing these substances as regards fastness, etc.

Practical Chemistry for Dyers.—Preparations of solutions, analysis of acids, alkalis, water for technical purposes, bleaching agents, tannin, mordants, indigo, coal, and other chemicals and materials used in bleaching and dyeing trades.

Cotton and Linen Bleaching and Cotton Dyeing.—Classification of the Fibres. Their origin, physical structure, action of chemical reagents, and methods of distinguishing the various vegetable fibres from animal fibres.

Water.—Temporary and permanent hardness of water, how caused and how removed. The effects of impurities in bleaching.

Bleaching.—Yarn bleaching for dyeing and for market, yarn bleaching machinery.

Cloth Bleaching.—The market, madder and Turkey red bleachers, with an explanation of the chemical changes which take place during the various operations.

Bleaching Kiers.—Open kier, injector kier, Mather-Thompson's kier. Open-width bleaching. Finishing bleached goods.

Theory of Dyeing.—Application of natural dyestuffs, substantive and alizarin colors, mineral colors, aniline blacks, etc. Finishing of dyed fabrics.

Text Books Recommended.

FIRST YEAR COURSE:

Inorganic Chemistry: "Chemistry for Schools of Science." Lecture. Parrish, 2s 6d.

Laboratory: "Practical Inorganic Chemistry," Part I. Clowes & Coleman, 2s 6d.

Practical Mathematics: "Practical Mathematics for Beginners." Castle. McMillan & Co. 2s 6d.

SECOND YEAR COURSE:

Inorganic Chemistry: "Inorganic Chemistry." G. S. Newth, 6s 6d.

Laboratory: "Practical Inorganic Chemistry," Part II. Clowes & Coleman. 3s 6d.

Organic Chemistry: "Elements of Organic Chemistry." E. I. Lewis. 2s 6d.

Laboratory: "Systematic Practical Organic Chemistry." G. M. Norman, 1s 6d.

THIRD YEAR COURSE:

Chemistry: Same Text Books as second year course.

Paper Manufacture: "Practical Paper Making" (Clapperton), 5s.—"A Text Book of Paper Making." Cross & Bevan, 12s 6d.

FOURTH YEAR COURSE:

Inorganic Chemistry: "Quantitative Analysis." Clowes & Coleman. 10s 6d.

Cotton and Linen Bleaching: "Dyeing of Textile Fabrics." Hummel's Revised Edition. [illegible]

NEW BOARD MILL.

D. M. Kelly, formerly of Carthage, N.Y., is in Newark, N.Y., building a board mill for [illegible] Bros., box manufacturers. The structure will be of concrete and steel, and thoroughly up-to-date. The present installation of one 72 in. machine will be followed by a second machine, and the plant should be in operation by October next.

The Canadian Red Cross

Dr. Jas. W. Robertson, whose name is a household word in Canada as that of the promoter of efficient dairying, Commissioner of Agriculture, and later chairman of the Royal Commission on Industrial Training and Technical Education, has been doing noble work in connection with the Canadian Red Cross Society.

Those who attended the annual meeting of the Canadian Pulp and Paper Association, and were fired by the enthusiasm for work for work's sake which the doctor displayed, can understand the zeal with which he would address himself to this humanitarian cause.

Dr. Robertson has recently published an appeal for contributions to the Red Cross Society, which we are more than happy to publish.

"Our country, with its Allies", he points out, "is waging a great war for justice, for the protection of small nations in the enjoyment of their rights, for continued and growing freedom, and for the maintenance of its pledged word of honor. Much destruction and desolation are being caused. Lives are being lost by the thousand. Canada's first contingent is now in the thick of it. Some will fall sick; many may be wounded; some will pay the last full measure of devotion to their country and its cause.

The Red Cross Society exists to succor the sick and wounded in war. The need of Red Cross Service is great and growing greater as the war goes on. The price of progress towards lasting peace is very, very dear. It cost lives, homes, health and much besides. Canada's part in the process of payment, through giving for Red Cross work, is mercifully light and easy even when all have given to the extent of really feeling it.

The soldiers and sailors pay the price exacted by the desolating struggle from week to week. What they paid in blood and did in sacrifice a month ago was not enough for them. Shall we say it was enough for us? What they are doing and suffering and achieving have put aside, for the time, all their thoughts and plans for individual welfare, comfort and safety. They don't hesitate to establish precedents. But they are precedents of heroic sacrifice for our country and its cause, for our principles and ideals that they may be upheld.

Canadians are generous in sentiment and generous in giving when their hearts and heads point the way. This is a case when they do so point clearly, persuasively and urgently. In this crisis, in the lives of nations and in the lives of stricken soldiers, none can pray too much, do too much or give too much.

I appeal for sums from $1 to $50, during the first week in May. Every $50 provides one additional hospital bed with the giver's name over it. By sending on about $10,000, you would serve your country well, bring credit to yourselves, and make all of us very proud of you. For the sake of the wounded boys, make the gift substantial. It will be an investment towards the recovery of some Canadian soldier, who stood in our stead that our cause might be upheld."

The Beaver Board Company Limited, of Thorold, Ont., recently suffered a loss of about eighteen thousand dollars when four frame dwellings belonging to the company and occupied by workmen were burned to the ground. The houses were located about a mile and a half from the town and, owing to a delay in sending in the alarm, the damage was much greater than it otherwise would have been.

MANUFACTURE OF ANILINE COLORS IN THE UNITED STATES

By I. F. STONE.

I am very pleased to appear before your very important association, in order to state the facts and conditions in connection with the possible procuring of supplies of Aniline Colors from Europe, and their manufacture and possible development in the United States, and so answer publicly the deluge of inquiries which are reaching us daily from American textile manufacturers and other consumers of aniline dyes, as to the present and future conditions.

As regards the possible European supply, as it is well known by those interested, no supplies are now coming from Germany, which is the principal source of supply for these products. Of the total consumption of dyes in America, it is estimated that about eighty per cent is furnished by Europe, and of this quantity it is estimated that Germany furnishes about seventy-five per cent; in other words, of all the dyes imported from Europe, Germany furnishes about three-quarters and other countries about one quarter. It might be supposed that the twenty-five per cent of imports which have been furnished by other countries, particularly England and Switzerland, might be continued, but as a matter of fact these other European factories are unable to furnish them because they are dependent largely on Germany for their immediate raw materials, and as Germany is now unable to furnish them these intermediate raw materials they are consequently unable to send us even their small proportion of the color supply. The United States is therefore now absolutely deprived of nearly eighty per cent of their supply of aniline colors. When this supply will again be resumed it is impossible for any one to state at this time, but it is very apparent, however, that it will be some time before European shipments can come through again, and a still longer time before they can come through in regular quantities, as owing to the continuance of the war, European factories are very much interrupted in their manufacture through lack of labor, raw material, etc., and will continue to be handicapped by these same conditions for a long time after the close of the war, whenever this may be. The prospect of American consumers, therefore, of securing a normal supply of dyestuffs for a long time to come from European sources, is very uncertain.

American consumers are therefore turning for possible relief to American manufacturers, but if Europe has been supplying them with eighty per cent of their consumption it is evident that American manufacturers, have only been supplying them with about twenty per cent, therefore could only continue in the beginning, to supply this percentage of the consumption, under normal conditions, and the serious question then is, whether or not the American percentage can be increased, and if so, how quickly and to what extent.

I have stated that American production is only about twenty per cent under normal conditions, but unfortunately even this small percentage could not be continued immediately, under war conditions, because American factories have been buying their partly finished, or what we call intermediate materials, from Europe, and making their colors from these intermediate materials, and immediately the war started shipments of these intermediate materials were stopped, and American factories were left, generally speaking, without any visible supply of these intermediate materials with which to make their colors.

It is not my intention to put before you a scientific or technical paper on the manufacture of aniline colors, but it will be necessary to give you some information as to how this is done, so that you will better understand the situation. The manufacture of aniline dyes is really in three stages, that is, first from the first raw materials, such as benzole, toluole, napthaline, etc., what is called the intermediate materials, are manufactured, such as aniline oil, nitro-benzole, aniline salts, and a host of other products nearly three hundred in all, and from these intermediate products the aniline dyes are finally manufactured. The principal raw materials are natural products of the United States, benzole, toluole, naphthaline, etc., and in normal times are sold at about the same prices here as in Europe, so that American manufacture starts out on an even basis with Europe as far as the supply of the first raw materials is concerned. It is in the manufacture of the second stage, or intermediate materials, that the American manufacturer encounters a check, as it was in the manufacture of these materials that European factories, particularly German, excelled, even with their raw material at the same cost as could have been supplied by American producers, and it is for this reason that American manufacturers of dyes could buy cheaper from Europe than they could manufacture here, and were doing so at the time the war commenced, and the shutting off of the shipments of these products at the beginning of the war, as I have already stated, left American factories without any visible supply of these materials with which to make their colors.

Obviously then, the only thing they could do in order to continue their manufacture of colors, was to make their own intermediate materials, but the beginning of their manufacture is at once attended with the investment of a large amount of money for factories and machinery—really the starting of a new factory in addition to their aniline factory—and an immediate increase in the cost of these materials as a result of higher manufacturing conditions in the United States and a consequent higher cost for aniline colors made from those higher priced intermediate materials, and the manufacturers of colors here are therefore confronted with the proposition of whether they can afford to risk the investment of this large amount of capital and the possible accumulation of a lot of high-priced materials, which they could not sell at prices based on their increased cost in case the war should end and more or less normal conditions be again resumed in a short time.

The only possible solution of this problem, which would protect them in normal times in the development of this industry, would be the help of the United States Government in the way of a high tariff which would

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Address delivered before the National Association of Hosiery and Underwear Manufacturers, Philadelphia, Pa. ,May 5th, 1915.

prevent the importation of colors at a lesser price than they could be manufactured here, and some sort of anti-dumping clause which would prevent the selling of colors into this country at lower prices than they are sold elsewhere, in order to prevent their successful manufacture here. A number of conferences between American chemical manufacturers and officials of the Government have been held, and while the Government shows every interest in the situation, particularly in the enactment of some sort of anti-dumping clause, and some time in the future will probably enact a proper tariff protection, it will not help out the present situation and capitalists are not willing, therefore, to risk the investment of their money in these industries, under these conditions.

In spite of the many newspaper reports that a number of firms were about to engage in the manufacture of aniline colors in this country, I do not know of a single specific instance where any responsible firm or corporation is about to engage in their manufacture, reports to the contrary notwithstanding. There are a number of firms, however, about to engage in the production of benzole, and some to manufacture products like carbolic acid, aniline oil, etc., but these products are not aniline colors, and the confusing of their enterprises with the manufacture of aniline colors has led to the report that the manufacture of aniline colors was about to be largely developed, and there is no foundation for this report as far as I have been able to ascertain, as far as new factories are concerned. At the present time, therefore, the only manufacturers of aniline colors are those who were in business before the commencement of the war, and to these factories American consumers will have to look for relief, for some time to come, in any event.

Simply to show you how these American factories stand, in normal times, I quote from a report by Mr. Thomas Norton, Commercial Agent of the Department of Commerce, recently published by the Department of Commerce, in which he states on page 10:

"The four establishments devoted to the production of dyes supply nearly 100 colors, largely, however, as already stated, by 'assembling' nearly finished products of foreign origin. These American firms are bold and enterprising, command about three million dollars capital, evidently doing the best they can under existing conditions to build up a national industry. Investigation shows that their advance, beyond certain limits, in the manufacture of either intermediate or finished dyes is persistently checked and prevented by the united action of German producers in under-selling them. The entire German color industry is so completely organized and accustomed to act as a unit in furthering the general interests, at home and abroad, that little success in facing their determined opposition has heretofore been obtained."

This extract from this report will show you what the American manufacturers have done and what they are up against. Just at present, however, the times are not normal, and German competition therefore is not a factor in the situation at the moment. Speaking for our own factory, which is the largest of the aniline factories in the United States, we have started to manufacture these intermediate products irrespective of cost, because the American consumers were willing to pay prices warranted our doing so under present conditions, but this is more or less a temporary condition, and it is the permanent condition which we are anxious to develop. As I have already stated, the Government can be of no immediate help in the development of this business, therefore the matter is really in the hands of American consumers, as if they are willing to support the American manufacturers for a sufficient length of time for them to get well established, i.e., continuing to pay prices for colors necessitated by the manufacture of intermediate materials here, the American manufacturers will then invest the money and increase their production to any extent which may be necessary, and I am very glad to say that many of the American consumers are showing a willingness to do this, as we have recently put before them a proposition to manufacture for them a certain color, which we call direct black (*) it being a color of the greatest importance and large consumption, and if they are willing to make contracts with us over a certain length of time, in this instance a year from the 1st of October, which from present advices a large part of them are very glad to do, we will at once increase our production of this particular color to large proportions, possibly enough to provide for the entire consumption, and the increase of this color will be followed by an increase in other large, important colors, under the same arrangement as quickly as it can be done, and this then, the quickest and best way to develop the American factory under present conditions.

It is regrettable that the manufacture of these intermediate materials under the present conditions, is at a much higher cost than under normal conditions, for the reason that many of the raw materials which are used in their manufacture are also used in the manufacture of explosives, and as the explosive manufacturers are willing to pay almost any price for supplies, the manufacturers of dyes are accordingly obliged to pay the same prices in order to obtain their supplies, the difference at this time being nearly three times as much as under normal conditions, which accounts for the high prices which we are obliged to ask for colors at this time.

Referring again to the black contracts about which I have just spoken, would say this is particularly interesting to your members who are hosiery manufacturers, as they are large consumers of black, and it has been found that our black can be used in such a way that it will replace largely sulphur and aniline blacks which have heretofore been used by many of them, so that there is no reason why hosiery manufacturers particularly should not be able to obtain all the black they can use by participating in the arrangement which I have mentioned in this address, viz., making a contract for their supplies for a length of time and at a price which will warrant our making the color for them without too much chance on our part; in other words, dividing the responsibility and reaping the mutual advantage of being able to have manufactured and secure adequate supplies under all conditions.

If we secure this help from American consumers, and reduce our risk by contracting as we have suggested, we believe by the end of the war the business will be so materially developed that the Government will see the necessity of continuing the manufacture of our products on a large scale, and then protect us by an increased duty as well as by the so-called anti-dumping clause before mentioned, and the business will then go on under successful conditions.

I might say in this connection, however, that even at the present high prices, which are about three times the normal prices, the actual cost of dyeing to most hosiery manufacturers is a very small percentage of the cost of their manufactured goods, taking for instance the item of cotton hosiery, where in normal times the dyestuff cost, not including labor or other expenses, would be about $3.00 for one hundred dozen of the average socks, or say three cents per dozen, and even in these abnormal times, with the high cost of colors, the same operation can be done for about five cents per dozen; in other words, even at the present high prices for black the cost of dyeing is only advanced about two cents per dozen, which is an infinitesimal advance to the ultimate consumer who buys a pair of socks, therefore it seems as though manufacturers need only ask a slight advance for their product, which would enable them to pay the higher price for dyestuffs, and continue operations, so insuring consumers of a regular supply of their ordinary materials, socks for instance, at an advance so small that it would not be questioned by any one. These same remarks also apply to the cost of dyeing other materials as well as hosiery, which is an equally small percentage of the value of the material which is dyed, it generally being estimated at about two per cent, so that the increase in the price of dyestuffs only means a small increase in the cost of the finished material, and the important question therefore should be the securing of dyestuffs rather than the price, so that manufacturing operations can go on without delay, and eventually the price for American made colors will become more normal, and probably not be much more if any more than European colors, even if they are given the increased protection by the Government, as competition among themselves, if nothing else, would insure reasonable prices.

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*Mr. Stone's address takes up certain colors which do not directly interest pulp and paper manufacturers but as Mr. Stone points out, "these same remarks apply also to the cost of dyeing other materials, as well as hosiery." —Ed.

The point to this whole address is simply the fact that aniline dyes can be manufactured in the United States successfully from American materials, irrespective of European conditions, if American consumers of colors are willing to pay prices which the extra cost of manufacturing under the present conditions, make necessary, and trust to the future to develop the industry to such an extent that they can work under normal conditions in competition with the world. If the consumers are willing to help, then the capital will be forthcoming to develop the manufacture to its utmost capacity, but if they are not willing to do their part, then there is no chance for the manufacture to develop at present to any extent, and the industry will continue to languish until the Government comes to the rescue by putting on a protective duty and enacting an anti-dumping clause, as mentioned.

Thanking you for your attention.

RAILWAY CO-OPERATION.

Canadian railways are taking a constantly increasing interest in forest fire prevention along their lines. Both the Grand Trunk and the Candian Pacific railways have provided public notices in smoking compartments, warning against the throwing of lighted matches, cigarettes and cigars from the train. The Canadian Pacific has printed fire warnings on the menu-cards. The Canadian Pacific, Canadian Northern and Algoma Central railways print fire prevention matter in their advertising literature, particularly in the circulars intended for campers, tourists, etc. A large percentage of the fire loss is preventable, and there is a steadily increasing realization of the fact that most of the loss can be avoided through the creation of an intelligent public sentiment along this line.

Development of Newfoundland

Sir Edward Morris, speaking for the Government in the Legislature of Newfoundland on April 22, outlined the contract which it is proposed to make with the Newfoundland Products Corporation, Limited, represented by Mr. Thomas L. Willson, of Woodstock, Ont., and with him is associated the Reid-Newfoundland Company. The expenditure suggested is large, the items being as follows:—

Water power	$6,440,300
General work	2,564,000
Industrial plant	3,745,000
Phosphoric acid plant	900,000
Ammonia plant	450,000
Working capital	2,000,000
Railway revision	250,000
Grand total	$16,349,300

The company proposes to establish at Bay of Islands at a cost of about $18,000,000 an industry for the manufacture of ammonium phosphate, which is a fertilizer, ammonia, cement, wood pulp and lumber. The details are set forth as follows as regards construction and equipment:

Coke and gas works	$ 799,000
Lime quarry	75,006
Lime kilns for 250 tons production per day	142,000
Calcium carbide works	462,800
Carbide crushing works	71,400
Electrode carbon works	25,000
Saw mills	211,800
Sulphite pulp mills, electrolytic bleaching plants and wood preparations	1,586,300
Machine shops, iron and brass foundries, boiler and structural shops, forges, pattern shops, and storage rooms	161,400
Engineering and supervision of foregoing items	228,300
	$3,745,000

In Sir Edward Morris's speech, the main features of the agreement were given as follows:

(1) The Government leases for a term of ninety-nine years, in so far as they have any power or property in the same, the water power or powers in and upon the Humber River, and in or upon Junction Brook, with the right to divert and dam the same or any lake or water powers within the drainage area of the Humber River; and also, should the company at any time within twenty-one years become the owners of any additional water powers within a distance of forty miles of the company's factories at Bay of Islands, within an area laid down by a map and defined in this agreement, the Government propose to allow the provisions of this agreement, with the exception of clause 10, to apply to any water powers so acquired and developed within the said area for the purposes of the same business.

(2) If the company fails to develop the water powers so acquired, then the advantages of the agreement shall not apply.

(3) The company agrees within two years to survey the Hamilton and Northwest rivers in Labrador, and finish the surveys within five years, and furnish the Government with all plans of the survey ,and the Government agree that if the company, within ten years from this date, in addition to an expenditure of

$5,000,000 at Bay of Islands, expend an additional sum of $5,000,000 in Newfoundland in connection with the extension of its business in Newfoundland, it will grant the company a water power on the Hamilton River from the head of Lake Winocapau to the sea or an equivalent water power on the Northwest River, Labrador, but the condition of the grant of the said water power is that the company shall within five years expend in the development of the said water power, and its plant in Labrador, the further sum of $10,000,000. In the event of failure to so spend, the grant shall be void, and the water power on the Hamilton or Northwest river shall revert to the crown.

(4) The company agrees to furnish up to 50,000 horse power in Labrador to all persons or companies operating within one hundred miles of their power houses.

(5) The Government grants to the company a block of limestone near the Humber River, about five miles from Bay of Islands, for the purpose of making lime.

(6) The company's property shall be free from municipal taxation. The stocks of the company are also free from taxation. Construction material and machinery will be admitted duty free. 70,000 acres of crown land are granted the company by the Government at 30 cents an acre for wharves, piers, docks, factories and warehouses. Property required not in possession of the crown to be taken and paid for by arbitration.

(7) The company has the right to build telephones between the factories, and piers and workshops.

(8) Phosphate rock, pyrites, electrodes, soda and bags for packages are admitted free of duty into the colony.

(9) Coal for use in connection with the company's work in Labrador is admitted duty free.

(10) The company agrees to sell at its works at wholesale prices, and deliver the same at all railway stations in Newfoundland, and at ports of call where the Reid-Newfoundland Company's steamers now call, its fertilizer, freight free.

(11) All damages to crown land to be paid for and settled by arbitration.

(12) Renewal of lease if not determined by 99 years.

(13) The company undertakes to begin actual construction operations within two years of the date of the agreement, and expend the sum of $5,000,000 within the island of Newfoundland within five years. Failure to begin or expend renders the agreement null and void.

(14) Dams to be constructed with proper log sluices for the passage of salmon and fish. Use of the waters by the public continues as heretofore.

(15) The company will provide cranes for lifting boats over dams.

WHO'S WHO IN THE CANADIAN PULP AND PAPER INDUSTRY

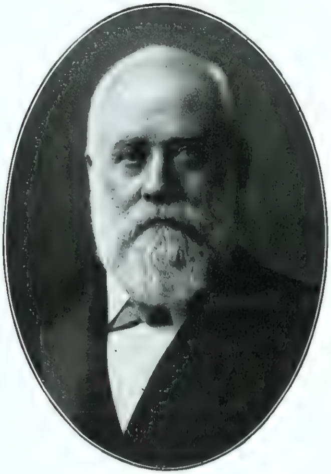
RICHARD BROWN, President of Brown Bros., Limited, Toronto

In the sketches of "Who's Who in the Canadian Pulp and Paper Industry," which have appeared regularly in the Pulp and Paper Magazine for several months, many references have been made to gentlemen connected with the business for long periods, but the honor of being identified with an institution for fifty-nine years falls to only one member and he is Richard Brown, President of Brown Bros., Limited, wholesale paper, stationery, printers' and bookbinders' supplies, Toronto. And remember this connection has been a continuous one and Mr. Brown, who this week celebrated his eighty-first birthday, is still active and at his desk every day directing the policy and details of the immense business, of which he and his brothers, John and Thomas (long since departed) began on a small scale on King Street East, on the site where the King Edward Hotel now stands, away back in 1856, continuing a business commenced by the family at Newcastle, England in 1774. Another outstanding feature is that the name of the firm has never changed with the exception that some years ago the original partnership was converted into a joint stock company with the usual addition of the word "Limited." Such a remarkable record is perhaps without parallel in the history of any paper house or paper dealer on the continent.

Just a year ago, when Mr. Brown celebrated his eightieth birthday, so widely is he esteemed and respected, that all the wholesale stationers of Toronto, where his name is a household word in the trade and a landmark for integrity took occasion to present him with an appreciative address on vellum, accompanied by a bouquet of eighty American Beauty roses, one for each birthday. The address expressed the hope that Mr. Brown might enjoy many more years of peace and health and referred in the highest terms to his "splendid career as a business man and an honorable competitor." No greater tribute could be paid him nor could there be a more comprehensive summing up of his life work in the paper trade of Canada.

If Mr. Brown was asked what have been the great underlying principles upon which the historic firm of which he is the honored head has been established, he would, in all liklihood, reply — honor, industry, service and application — for he has been an untiring worker all his days and has imbued others with the same spirit of loyalty and devotion. Harmonious relations have always existed between employer and employees and among the latter, now numbering some 200, in the different departments, and many who have never been in the service of any other establishment Their worth and work have always been recognized by good wages. With their co-operation, the high traditions of the house have been maintained in every particular and the institution has for many years been one of the largest of its kind in the Dominion.

The son of a practical bookmaker, the subject of this reference was born in Newcastle-on-Tyne, England, on May 13, 1834, and when twelve years old accompanied his father, six brothers and two sisters across the Atlantic landing in New York. The family did not remain long over the border but made their way to Toronto via Albany and the Erie canal to Lewiston and thence by steamer to the city which has been their home ever since 1846. Mr. Brown has seen Toronto grow from a sparcely settled, muddy community containing only a few thousand people to a great metropolitan centre of half a million souls. The first job that Richard Brown secured—and the only one he ever held before entering business in his own behalf—was with Thomas Maclear, who ran a bookstore on Yonge Street, and was a leading factor in the publishing business in those early days when Ontario was still known at Upper Canada, Maclear established the Anglo-American Magazine, a well-known literary publication, which was conducted until seven volumes had appeared when it shared the fate of many similar ventures for Canadians were not great readers in those stirring times and had comparatively little leasure when pioneering their way in a young and struggling country. After serving an apprenticeship, in which he gained a good knowledge in the book and publishing line, Richard and his two brothers, Thomas and John, succeeded their father in business on King Street where he had toiled and prospered for ten years. Thomas Brown, the eldest of the brothers passed away in 1867, the year of Confederation, and some fifteen years later John joined the silent majority. Richard still comes down to business every morning as he has been doing faithfully and regularly for the past fifty nine years, being the sole survivor of the original partnership. Until the last year or two, Mr. Brown remained at his desk until the close of the day but so ably is the business looked after by his associates that he now devotes only the morning hours to duty. His son T. Albert Brown, is vice-president of the company and another son Norman is a director, while two nephews, Harry and Charles Brown, also fill responsible positions.



The expansion of the business is one that can be reviewed with pride by its veteran founder and his co-workers. From one small store it has steadily grown until to-day five large floors are utilized representing an area of some seventy thousand square feet, for manufacturing, warehousing, display, storage and office purposes. In the primitive quarters of the firm on the north side of King Street East, one store at first answered all requirements and then another had to be taken in. Next a factory was put in operation and then a fine five storey structure was built on Wellington Street West, and filled with goods and equipment. In the great fire, which swept over the lower business section of Toronto eleven years ago, this splendid home fell a prey to the element although it was thought at the time of its construction that it was practically flameproof. During the process of rebuilding the firm had secured the Queen City curling rink as a warehouse and shipping room. It is said that disaster seldom comes single handed and it proved to be true in this case, for a few months later in the same year the rink went up in smoke. Such misfortune within a brief period would have disheartened many a stout hearted man, or proved an irretrievable barrier, but not so in the case of Mr. Brown, for work on the reinforced concrete and expanded metal building on Wellington Street West went on apace and there was but slight interruption to their paper business.

About a year ago the firm finding their quarters in this new home, completed in 1906—although thought to be large enough for all time—too congested bought the Rolph and Clark building, at the corner of Simcoe and Pearl Streets where every available foot in the spacious five storey structure is devoted to the operations of the firm.

Mr. Brown's associations with the paper game have not only been in the selling line but the manufacturing end as well. In 1880 in company with John R. Barber, Charles Riordon, Rev. Dr. Briggs and others, the plant of the Toronto Paper Manufacturing Company at Cornwall, Ont., was established and Mr. Brown remained a director of the company until a couple of years ago when he retired from the board, his place being taken by his son, T. Albert Brown. Mr. Brown has seen that business grow too from only one, seventy inch machine for making book, bond, ledger and writing paper with an output of five tons a day, to a three machine mill with a capacity of twenty one tons.

Outside of business Mr. Brown has no hobbies. Beyond a trip to the Old Country every few years he has given his entire time and attention to the concern, whose destinies he has guided so worthily and well for close onto sixty years. He has always been greatly interested in religious work and prominently connected with Sherbourne Street Methodist Church, where he has filled many other important offices with the same enthusiasm and devotion that have characterized his career in commercial and industrial affairs.

FOREST FIRES.

Forest fires are unnecessary, are nearly always the result of carelessness, and may wipe out in an hour what nature has taken hundreds of years to create.

They destroy existing forests.
They destroy the possibility of future forests.
They destroy a great market for labor.
They destroy the beauty of a region.
They destroy homes.
They destroy lives.
They destroy prosperity.

REPRESENTATIONS OF PULP AND PAPER ASSOCIATION BEFORE BOARD OF RAILWAY COMMISSIONERS

In Ottawa, on Monday, May 10th, Mr. A. D. Huff appeared before the Board of Railway Commissioners, to develop the objections which pulp and paper manufacturers have to any increases in freight rates. Mr. Huff's address to the Board was substantially as follows:—

At the hearing in Ottawa on April 15th, we filed statements as per exhibits 66 and 67 showing comparative revenue on shipments of paper, woodpulp and pulpwood in the United States and Canada. It was suggested that the figures given were not representative of average conditions and I agreed to prepare statements which would be more satisfactory, and now beg leave to file statement No. 4 giving an analysis of carload shipments from 11 of the principal mills in Ontario, Quebec, New Brunswick and Nova Scotia for two months of 1914, which I am sure, will amply demonstrate the soundness of our contention.

This statement shows the number of cars, average weight per car, average haul, freight revenue per car, per car mile, per ton mile and per ton of freight. You will note that for purpose of comparison we have shown in the case of paper and woodpulp the movement between points in Ontario and Quebec and also between points in those two provinces and New Brunswick and Nova Scotia, as well as the averages for the total movement of each commodity. There are two or three instances in Ontario and Quebec where rates on woodpulp of 1½ and 2 cents apply for short hauls which might be considered as switch movements, and would if included in this statement materially increase the per car mile and per ton mile figures, but as stated in connection with exhibit No. 67, in order to be fair we have not included these movements.

You will observe that the average revenue on paper per car mile is 23.15 cents and per ton mile 10.76 mills, which is considerably in excess of the figures shown in previous statement. The average revenue on woodpulp is somewhat lower, being reduced by the longer average haul but are still high based on any reasonable comparison, particularly having in view the volume of business, the high average load per car, which you will note is nearly 58,000 lbs., and the fact that this is a raw material on which we pay freight on over twice the weight for which we get paid.

On pulpwood the average revenue is 33.10 cents per car mile and 11.04 mills per ton mile, which are also greatly in excess of figures shown in previous statement. To emphasize the significance of these figures, I might point out that the average revenue per ton mile for the Dominion of Canada on all classes of traffic for year ending June 30th, 1914, was 7.42 mills and for the Grand Trunk Lines in Canada, according to Mr. Kelley's statement, 6.60 mills. The average revenue per ton of freight for the Dominion was $1.614. On the points in the United States. (Not shown here.—Ed.) enue per ton of freight was, paper $2.646, woodpulp $1.727.

We have also prepared statements of rates covering representative movements of paper and pulp between points in the Unitd States. (Not shown here.—Ed.) In these statements we have purposely omitted including any of the conspicuously low rates in effect from New England which were objected to by Mr. McInnes in exhibit No. 66, and the rates we have shown may be considered as representing the highest average rates maintaining in the United States, and even on this basis we find that the average rate per ton per mile is 5.76 cents on paper as against 10.76 for Eastern

STATEMENT No. 4.

Analysis of Carload Shipments from 11 Mills for Two Months of 1914, Showing Average Tonnage and Revenue.

					Revenue		
Paper. (See Note.)	No. of Cars	Average Weight Pounds	Av'ge Haul. Miles.	Per Car. Dollars.	Per Car Mile. Cents.	Per Ton Mile. Mills.	Per Ton of Freight. Dollars.
Between Points in Ontario & Quebec	883	43,457	217	54.24	25.	11.5	2.496
Between Points in Ontario and Quebec and Lower Provinces	58	36,793	685	98.44	14.37	7.81	5.351
Average for Total		43,046	246	56.96	23.15	10.76	2.646
Woodpulp.							
Between Points in Ontario & Quebec	456	58,989	186	44.52	23.9	8.12	1.510
Between Points in Ontario and Quebec and Lower Provinces	59	47,783	662	90.99	13.7	5.75	3.808
Average for Total		57,705	240	49.84	20.77	7.20	1.727
Pulpwood.							
Between Points in Ontario & Quebec	2,386	59,904	70	23.17	33.10	11.04	.773

NOTE.—Includes export shipments to Montreal and Quebec on basis of last year's rates, which have since been increased by approximately one-half cent per 100 lbs. All terminal charges deducted before computing average revenue.

Canada, and 5.73 cents on woodpulp as against 7.2 cents for Eastern Canada.

I am sure that these comparisons will be a surprise to even our railroad friends, and as stated at an earlier hearing, am more than satisfied that if the railroads had analyzed the rates prevailing on these commodities in Eastern Canada that they would not have been included in their application. We have already stated that the cost of raw materials and wages of the pulp and paper manufacturers has materially increased in recent years. I have been supplied with some additional information on this point in corroboration of that statement.

One firm says: "The exact fact is that since 1909 the cost of production has steadily increased, while the price received for the product has regularly lowered."

Another pulp mill in Quebec shows that there was in 1914 about $2.00 less available for profits and for expenses other than labor and material on every ton of pulp manufactured.

In regard to labor: There has on an average been a very material increase, in some cases over 50 per cent. In a number of instances labor conditions have forced the mills to change from two to three shifts per 24 hours, while the wages per day were not reduced, and in some cases increased. One mill has given comparisons for the years 1911 and 1914, during which time the cost of labor increased over 30 per cent with no addition to plant.

In regard to cost of pulpwood: I have already quoted one firm's remarks, and I have figures from another mill showing that the cost of wood f.o.b. cars at point of shipment has increased over $1.00 per cord since 1910. One mill brought in 6,900 cords of wood last year from points taking rates running over 7½ cents per 100, and the proposed increase in freight rates alone would mean approximately $1,500.00, or 22 cents per cord. I may say in this connection that the figures previously submitted (statement 2, exhibit 68) showing increase on raw material, are undoubtedly altogether too low, particularly in the case of pulpwood. Our computation was based on minimum increase of ¼ cent per 100 lbs., but I find that a considerable portion of the wood moved from points taking rates higher than 7½ cents, which would mean an increase of ½ cent per 100 lbs. We have already pointed out that notwithstanding these heavy increases in cost of operation and production there has been a material decrease in the prices obtained for the manufactured product in practically all lines, in newsprint as much as $5.00 per ton. In the case of woodpulp, the price has dropped as much as $2.00 per ton. In the case of sulphite pulp, when the United States Government took off the duty on European pulp in 1913 it resulted in a drop of $3.00 per ton in the price of the Canadian product as the European shipper naturally reduced his price equivalent with the reduction in duty. I might add that the removal of duty was made retroactive resulting in a refund to United States importers of European pulp of about $3,000,000.00. You will appreciate that this situation naturally reduced the price of pulp in Canada.

I think it should be apparent to everyone that we are not opposing the proposed advance from any selfish or ulterior motive. The effect of the proposed increases would be more serious to this industry than probably any other, and I hope that the Commission as well as our railroad friends are convinced of the justification of our case, and that our rates should not be advanced, and as previously intimated when conditions have become more normal we will probably ask the Board to consider a downward revision, as the more we study the situation the more firmly convinced we are that we are already paying more than our fair share towards the maintenance of transportation in this country.

We are not at all satisfied as to the justification or merits of the railroads' application as presented, but cannot discuss this phase at length until the railroads have submitted statements of their financial conditions and the causes for same, which can be analyzed. There are three roads prominently identified with this application. One of them is paying a 10 per cent dividend and from information at present obtainable are abundantly able to continue to do so. We feel that we can eliminate this road from any discussion as to necessity. The weak sister of the trio is unquestionably in bad shape, but before relief or a remedy can be considered, I think that the public is entitled to know exactly what their present condition is, and whether the millions of dollars advanced to them by the Canadian Government as well as the millions of pounds realized in the Old Country from the sale of bonds, has been properly and efficiently applied to the purposes for which it was intended. If it is found that such is not the case, it might be to the interest of the country at large for the Government to consider bringing about a reorganization and not expect the people of this country to continue to pour money into what looks like a bottomless pit.

So far as the Grand Trunk is concerned, they should show to what extent their financial requirements are due to the operation of non-profitable lines in the United States. Chairman Smithers, in presenting the annual report on April 15th, emphasized the fact that the result of operation of their United States lines was detrimental to the System as a whole. Mr. Smithers stated that the Grand Trunk Western alone showed net revenue deficiency for the year of 112,000 pounds, the D. G. H. & M. net revenue deficiency of 20,000 pounds. If the financial trouble of the Grand Trunk is due in a large measure to this cause, surely it is not reasonable to expect the Canadian shipper to make up for such deficiency. Mr. Smithers admitted that the application of the 5 per cent increase recently granted by the Interstate Commerce Commission would materially improve the situation. Before any proposition for relief is considered by this Commission, we should know to what extent the situation will be relieved as a result of the 5 per cent increase.

Mr. Smithers also points out that as a result of authority given by the Canadian Parliament, the company is given power to make financial arrangements with companies in the United States, in which they have a controlling interest. He states that this will enable the Grand Trunk to assist the Central Vermont Ry. We do not see why such assistance should be imposed on the Canadian shipper in the way of increased freight rates.

Mr. Smithers also mentions an item of £1,286,100 which was largely expended for the acquisition of securities of the Grand Trunk Pacific Development & Elevator Co. Is it considered reasonable that the shippers of Eastern Canada should be assessed to make up this deficiency? We think the Grand Trunk should of its own volition submit a full and frank statement of the financial operations of the Grand Trunk, and particularly its relation to subsidiary lines in the United States, showing to what extent the earnings of the line in Canada have been or are being drawn on to make up deficiencies in the United States lines.

Owing to general dislocation of business we have been altogether too busy in looking after our interests to devote anything like sufficient time to prepare this case in a thorough manner. We hope that we have succeeded in proving that no increase in our rates is warranted, but if necessary we are prepared to engage counsel, make a thorough analysis of the railway, finances, operations, etc., and present our views in a more logical and convincing manner.

REMOVAL OF CONDENSED WATERS FROM DRYERS.

A reliable method for removing the condensed water from the drying cylinders is very important and deserves special attention. One cannot be too careful in making sure that the apparatus for this purpose is always in perfect order. The quality of the paper depends in large measure on the proper working of the steam trap. The first essential in the proper operating of the steam trap is clean, oil-free steam. The best of traps will be hindered in working if it is furnished with steam that is not technically pure.

Live steam carries a minimum amount of impurities, which makes its use very desirable for heating the paper machine. Exhaust steam always carries oil and other impurities, which often cause trouble by soiling and hindering the action of all parts they come in contact with. Besides this, the oily residues increase the tendency to stick on the part of the mechanisms that move hard, causing not only an obstruction to the passage of steam and an extra load on the engine, but may even give rise to danger of explosion. A thorough removal of oil from exhaust steam is the first condition for the proper working of the steam trap and the even dry of the sheet. The economic effect goes a step farther, as this condensed water may be fed to the boiler without hesitation. Practically all the steam in a pulp or paper mill that goes to the engine is condensed in the dryers or other heating apparatus and is returned to the boiler. Reliable apparatus can be had for removing all the oil from exhaust steam.

Steam traps are of two general types: expansion traps that work by the function of a thin pipe or a membrane, and float traps in open or closed form. The former are adapted to low pressures, while the float traps work well under a great variety of conditions for high pressures and for superheated steam.

The best steam trap is one which, with a simple mechanism, will effect the quickest removal of condensation, prevent loss of steam, and work properly even with a slight vacuum. A good steam trap will not fail to work when large amounts of water are admitted, a circumstance which naturally puts an extra demand on its operation. This is where a trap with a relatively large valve will show up well.

Many designs of steam traps have too small a valve, so that the drying cylinders, for instance, must be provided with special apparatus for ensuring the prompt removal of the large amounts of water condensed. A further result of a small valve is that the water flowing through with great velocity always carries solids in suspension and causes rapid wear on the valve seat, etc. A worn valve naturally allows live steam to escape. This of course is not to be permitted, as in a modern mill no steam may be wasted.

Gauge glasses or petcocks are essential where several traps empty into a common pipe. Steam traps should also be easily detached, so as to be cleaned quickly. No trap should be sent out by the manufacturer until it has been thoroughly blown out with steam, as considerable sand will unavoidably be retained by grooves, etc., on the the inside, and this will gradually work into the valve and cause trouble.

It is a distinct advantage to have each dryer finished with its own steam trap instead of all or several connected with a common pipe. The latter arrangement may do more harm than good, as seldom will two cylinders be working at just the same pressure, and the differences in pressure are often great. There should be no pressure on the outlet water. Do not be too sparing of steam traps. The slight increase in expense is well repaid in better and more uniform drying of paper and the saving of much trouble.

In winter there is more likely to be trouble, especially if the traps deliver into open channels. If the exhaust steam carries much cylinder oil, this collects in the trap, hardens or freezes, stops the water from leaving, and causes pounding in the pipes. When the steam trap fails, the water backs up and the dryer fills with water, makes it difficult to heat, and brings on other troubles. An unprotected trap out of doors is likely to freeze and burst. Such traps should have petcocks for draining them in case of expected cold.

Of no less importance is a satisfactory arrangement for removing the water from the dryers. All the water should not be removed, as too high a temperature is injurious to the paper, but it is equally important that too much water is not left in the dryer. This hot water is of course a valuable supply for the steam boiler. The danger of a cylinder running dry on a high-speed machine is very slight, as the centrifugal force makes it practically impossible to remove all the water by the apparatus in use, and irregular heating is thus avoided. Dippers should work both left and right-handed and operate even when there is no pressure in the dryer.

The author recalls a case with an old-type machine, having but one dipper in each cylinder, where one dryer could not be heated uniformly. The manhole was opened and the dryer was found nearly half full of water, the dipper having turned around. With the closed side of the dipper in front, the condensed water naturally stayed in the dryer. Proper heating was resumed when the dryer turned in the right direction.

Most apparatus for removing condensed water works all right with oil free steam, and if this is not the case, the trouble probably lies with the lack of attention on the part of the workmen.—"Paper."

HAS GONE TO THE FRONT.

The readers of Pulp and Paper Magazine will learn with regret of the departure for France, under military orders, of M. J. R. Booth, London, our British correspondent. For several years Mr. Booth has brought out clearly, issue by issue, the outstanding features of the British trade situation

We earnestly hope that good fortune may attend Mr Booth, and that he may return soon to re-assume the responsibilities which he has so capably discharged.

PULP AND PAPER NEWS

The sinking of the Lusitania brought grief to many families in various walks of life and in the paper world the death of George R. Copping who went down with his wife, has been learned with extreme regret. Mr. Copping was one of the most successful and energetic business men in Toronto and was connected with a number of industrial concerns, being President of the Reliance Knitting Co., the Peterboro Carpet Co. and conducted a flourishing manufacturers' agency. It was in matters connected with the Reliance Knitting Co. that he left for England. He was also a large share holder in the Provincial Paper Mills Co. and the Interlake Tissue Mills and was President of the Barber Paper and Coating Mills of Georgetown, Ont., now known as the Georgetown Division of the Provincial Paper Mills Co. He took a great interest in the paper trade and devoted a considerable portion of his time to it. Mr. Copping was a warm personal friend and associate of T. A. Weldon, Vice-President of the Provincial Paper Mills Co., and was held in high regard for his sound judgment and progressive ideals. Whatever Mr. Copping put his hand to, he imbued the undertaking with spirit and life and took a pardonable pride in the success of his business ventures. He leaves two sons, Norman and Russell Copping.

The Late G. R. Copping.

Other interested in the publishing business was J. R. Rogers, editor of "Jack Canuck", a Toronto weekly established four years ago. Mr. Rogers who lost his life was for many years a compositor in the Methodist Bookroom. Ernest Cowper, a member of his staff traveling with him, was among the survivors. J. H. Charles, secretary-treasurer of the Musson Book Co., Toronto, and Chairman of the Publishers Section of the Board of Trade was also a passenger with his daughter, Miss Doris Charles, on the ill-fated steamer. Both were saved.

William Innes, has been appointed selling agent in London, Eng. for the Interlake Tissue Mills of Merritton, Ont. He formerly represented the company in Montreal.

I. H. Weldon, president of the Provincial Paper Mills Company, Limited, Toronto, who has been spending several weeks in the prairie provinces and among the western states attending the Panama-Pacific Exposition at San Francisco, has returned home. He was accompanied by Mrs. Weldon and reports that prospects of business in the west are improving and with every promise of a bumper crop, conditions should be normal this fall.

A new match factory will be built at Deseronto, Ont., by the Rathbun Match Company, Limited, of which H. W. Rathbun is president.

Hon. W. H. Hearst, Premier of Ontario, who returned recently from an extended tour of the northern part of the province was delighted with the progress made during the past year and thinks the more real advancement in clearing the land and along agricultural lines has been effected than in any two years previously. A tremendous quantity of pulp wood was taken out last year at every station and siding, not only along the Timiskaming and Northern Ontario Railway but also the Transcontinental. The prospects of the north were never better. This fact is borne out by a recent visit of J. L. Englehart, Chairman of T. and N. O. Railway Commission, who states that seventy-two thousand cords were handled last month, a figure in excess of anything attained heretofore. Half of this has already been disposed of and the remainder will go as soon as it can be handled. Nineteen thousand cords remain to be sold but no difficulty is expected in finding a market for it.

The Trent River Paper Company, Limited, of Frankford, Ont., are now turning out several new lines in straw board, wood board and filled board, James Logie has been appointed selling agent for the company in Toronto.

A charter has been granted to the Camwick Lumber Company, Limited of Montreal, with a capital stock of fifty thousand dollars. The company is empowered to manufacture, sell and deal in wood products of all kinds, as well as buy and sell timber limits, wood lands, etc.

The Pigeon River Lumber Company, Limited, of Port Arthur, Ont., has been federally incorporated to take over the business and assets of the Pigeon River Lumber Company. The capital stock is five hundred thousand dollars and, among the other powers conferred on the company under the new charter, is that of building and operating pulp and paper mills. William Scott and D. W. Chamberlain, of Port Arthur are at the back of the new concern.

The many friends of F. A. Ritchie, of the firm of Ritchie and Ramsey, coated paper manufacturers, Toronto will sympathsize with his in the death of his mother who passed away recently in Montreal.

OTTAWA NOTES.

Ottawa, Ont., May 10.

An Order-in-Council has been passed by the Government forbidding, among a long list of other articles, the export of spruce and ash to the United States, except for domestic consumption in that country. Certificates of destination for such lumber will have to be supplied by shippers at Canadian ports of exit to the United States. The export of spruce and ash is also forbidden to all other destinations except the United Kingdom, British possessions nd protectorates, France, Japan and Russia, except Baltic ports.

The new 50-ton sulphite pulp mill built by the J. R. Booth Company is now in operation. As a result of its addition to the pulp making capacity of the Booth plant, the firm is now able to manufacture all its own pulp. The flume which recently gave way at the plant has been completely repaired and the company is now taking advantage of water conditions to manufacture a considerable quantity of pulp. Rains during the past two weeks have been heavy and as a result the water in the Ottawa River has risen materially. It is being generally predicted that water conditions with ordinary rainfall, will not be nearly so bad as last year when pulp and paper firms in the Ottawa Valley lost thousands of dollars.

According to London cables Sir George Perley, whose prominent connection with the Riordon Company will be remembered, has been boosting the pulp and paper resources of all Canada in his capacity as acting High Commissioner in England. Sir George presided last week at a meeting of the Colonial section of the Royal Society of Arts in London, at which a paper on the Empire's resources in paper-making materials was read by Mr. S. C. Phillips. After emphasizing the importance of rendering Great Britain independent of any source of supply outside the Empire, Mr. Phillips referred to Canada and Newfoundland as leaders both in materials and processes of manufacture of paper. Sir George then followed, explaining the conservation methods adopted by the Canadian Government with a view to perpetuating the Dominion's resources and pointing out the extent of these latter.

Paper manufacturers who do a considerable business with the United States will now have to pay war taxes on bank paper which they receive from dealers in that country, as well as that which they themselves issue in the form of cheques, drafts, bills of exchange, etc. The Government has decided to reverse a former decision that United States bank paper would not be liable to the war tax, and hence it will be the duty of the Canadian who receives the cheque to affix the war stamp thereon. Although the war stamp taxes on letters and bank paper have been in operation for some time and are proving an expensive matter for firms which do a large amount of catalogue or mailing business, it is not affecting the demand for catalogues, envelopes or the like to any appreciable extent. This relieves the apprehensions entertained by some paper manufacturers.

Of considerable interest to the pulp and paper industry was the announcement that the Government would operate the National Transcontinental Railway from Winnipeg to Moncton as well as the Lake Superior division of the Grand Trunk Railway having refused to take the N. T. R. over. According to statements made from time to time in Parliament, the operation of the whole Transcontinental line will immensely enlarge the available raw material for the Canadian paper industry. The prediction was once made by Sir Wilfrid Laurier that with the operation of the whole road, the centre of the pulp making industry would shift west, but whether or not this comes true, there is little doubt that it will open up a new and almost virgin territory in Northern Manitoba, Ontario and Quebec.

Your correspondent learns on very good authority that the idea of a general election in Canada at this time has been abandoned by the Government. Judging from those expressions of opinion which have come to hand from members of the pulp and paper trade in Canada, the Government's decision not to go to the country at this time will be commended. A general election, it was feared, would add a crushing burden to business generally, none too good as it is already.

CO-OPERATIVE FIRE PROTECTION.

The Commission of Conservation reports that the co-operative idea in forest fire protection has gained real headway in eastern Canada during the past year. Not only have the two existing forest protection associations in Quebec made satisfactory records, and increased in scope and stability, but there is a movement in favor of organizing a third association, which will probably materialize for the season of 1916. The territory embraced within the latter includes the upper head-waters of the Ottawa river in the province of Quebec, and the new organization will be known as the Upper Ottawa Forest Protection Association.

The neighbor of the proposed new association on the east is the Lower Ottawa Forest Protection Association, which was organized in the spring of 1914. The territory patrolled in 1914 comprised 11,812 square miles, or 7,559,680 acres, on the watersheds of the Gatineau, Lievre, Rouge, Nation and Coulonge rivers. The staff consisted of a chief inspector, three inspectors, and 52 rangers. Although the severest drought of many years occurred during May, June and July, the fire loss did not exceed eight-tenths of one per cent of the amount of timber protected. The total number of fires extinguished was 154, of which 72 were caused by settlers, 15 by fishermen and sportsmen, 17 by lightning, 12 by drivers and woodsmen, 4 by railroads, 9 by trappers and Indians, and 25 of unknown origin. The total cost of the patrol and fire-fighting work was $1.91 per square mile, or less than three tenths of one cent per acre.

The territory of the St. Maurice Forest Protection Association lies next on the east of that of the Lower Ottawa Association, and comprises 12,707 square miles, or 8,132,416 acres. This represents an increase of 853,363 acres over the previous year. This association is the pioneer of its kind in Canada, having been three years in existence. Its staff during 1914 consisted of a manager, clerk, six inspectors, and 54 rangers. Two hundred and thirty-one fires were reported, of which 21 were set by river drivers, 10 by fishermen, 36 by railways, 80 by settlers, and 46 unknown. The balance were due to miscellaneous known causes. The total cost of patrol and fire-fighting was $2.25 per square mile, or about one-third of a cent per acre. The cost of fire fighting was unusually high, on account of the extreme drought of the spring and midsummer.

The Markets

CANADIAN MARKETS

Th news print market ermains about the same, and some mills are very busy, while others are not rushed. The demand has not varied much during the past few weeks, and export figures for February show that the tonnage holds its own against January of the present year and exceeds that of February, 1914. The shipments in January, 1915, totalled $1,085,019 and in February $1,082,032, of which the United States took $960,786. The trade for the eleven months for the fiscal year now closed reached $12,567,470, and of this the United States took $10,811,505. Australia was the next best customer, buying from Canada $647,376, and the reason of this is that Scandinavian exports have been cut off materially during the war period. New Zealand took $460,092, Great Britain $176,236, and other countries combined $472,261.

The exports of mechanical pulp in February were $263,948, as compared with $239,758 in January and $174,522 in February a year ago, which showing is considered very good. Sulphite exports for February were $358,983, which was $34,795 under the January figures, but $104,733 greater than in February, 1914. The exports of sulphite for the eleven months of the past fiscal year were $4,182,806, and for the same period, the exports of ground wood pulp were $4,414,398. The market for ground wood continues fair, but prices are not high. In sulphite there is a different tale to tell, as stocks in America are being rapidly depleted and, owing to the submarine blockade declared by Germany, only a few thousand tons have been landed in America during the past five weeks, while it is estimated that stocks have been reduced during the same period by thirty or forty thousand tons. Owing to the peril of shipping and the high rates of freight, which have advanced from $3 to $5 per ton, it is stated, by those in a position to know, that prices are likely to increase. Consumers have not yet got face to face with a trying situation, such as may arise and are buying carefully. Canadian plants are sold up, however, for a considerable period. Owing to Germany having declared coal contraband of war and stopping several neutral vessels laden with coal of late, it is thought that Scandinavia cannot send in pulp much longer, and production will be somewhat affected. Norway and Sweden being unable to secure coal and sulphur. England has also placed an embargo on coal shipped to any other port than that of her allies and this, combined with the action of Germany will prove a severe blow to Scandinavian mills. The question arises what will the latter do when their supplies run short.

In the book and writing line, plants are doing a fair business. One leading Canadian mill is now shipping book paper to South America, and hopes to develop considerable trade in this line, particularly with the Argentine Republic. Some mills, particularly those located along the Cornwall canal and deriving their power either from the canal itself or from power companies depending upon the levels in that waterway, have been seriously interfered with in their output, due to the low water and are operating only part time. It is understood that the Toronto Paper Manufacturing Co., whose plant is at Cornwall, has been awarded the contract for supplying book paper for parliamentary documents to the Federal Government for the coming year, the figure being three and three-quarter cents. It is learned that the amount required is from five to seven hundred tons to be delivered partly in sheets and in rolls, the sheets to be 27 x 41 and of sixty pound weight.

In other lines of paper the outlook is better, and several good orders have been placed. Glazed kraft is stiffer in price, but wrapping papers are rather quiet. Jobbers report a fair turnover during the present month. There is again considerable cutting in paper bag quotations and 60, 10, 10 and 5 per cent discount is being offered by some. In the rag and paper stock arena there is little doing at the present time, and business is quiet.

Quotations, f.o.b. Toronto, are:—

Paper.

News (rolls), $1.90 to $2.00 at mill, in carload lots.
Nows (sheets), $2.00 to $2.20 at mill, in carload lots.
Book papers (carload), No. 3, 4.00c to 4.25c.
Book papers (ton lots), 4.25c to 5.75c.
Book papers (carload), No. 2, 4.50c.
Book papers (ton lots), No. 2, 4.75c to 5.50c.
Book papers (carload) No. 1, 5.00c to 5.50c.
Book papers (ton lots), No. 1, 5.50c up.
Sulphite bonds, 6½c to 7½c.
Writings, 4½c up.
Grey Browns, $2.00 to $2.75.
Fibre, $2.75 to $3.75.
Manila, B., $2.25 to $3.25.
Manila, No. 2, $2.75 to $3.50.
Manila, No. 1, $3.00 to $3.75.
Unglazed Kraft, $3.25 to $4.50.
Glazed Kraft $4.25 to $5.50.

Pulp.

Ground wood pulp (at mill), $15 to $16.
Ground wood, $20 to $23, delivered.
Sulphite (unbleached), $38 to $42 del. in Canada.
Sulphite (unbleached), $38 to $44, delivered in U.S.
Sulphite (bleached), $54 to $58.

Paper Stock.

No. 1 hard shavings, $2.00.

Pulps.

Ground Wood, No. 1, $19 to $20, delivered.
Ground Wood, No. 2, $15 to $16, delivered.
Unbleached Sulphite, dom., 2.20c to 2.75c, delivered.
Unbleached Sulphite, impt., 1.80c to 2c, ex dock, N.Y.
Bleached Sulphite, domestic, 3c to 3.40c, delivered.
Bleached Sulphite, impt., 2.60 to 2.90, ex dock, N.Y.
Easy Bleaching, impt., 2.05c to 2.15c, ex dock, N.Y.
Unbleached sulphate, impt., 1.80c to 2.05c ex dock N.Y.
Bleached sulphate, impt., 2.75c to 2.90c, ex dock, N.Y.
Kraft Pulp, 1.80c to 1.95c, ex dock, New York.

Paper.

News, rolls, transient business, 2.10c to 2.15c, f.o.b.
News, rolls, contract renewals, 2c to 2.10c, f.o.b.
News, side runs, 2c to 2.05c, f.o.b. New York.
News, sheets, 2.20c to 2.35c,f.o.b. New York.
Book papers, car lots, S. & S.C., $4 to $4.50, f.o.b.

Writing paper, extra superfine, 13½c to 17c, del. east of Miss. River.
Writing paper, superfine, 11c to 13c, del. east Miss R.
Writing paper, No. 1, fine, 9c, del east Miss. River.
Writing paper, No. 2, fine, 8c del. east Miss River.
Writing paper, engine sized, 5c to 8c, east Miss. R.
Bond paper, 5c to 24c, delivered east of Miss. R.
Ledger paper,5c to 25c, delivered east of Miss. R.
Linen paper, 8c to 18c, delivered east of Miss. River.
Manila jute, 4¾c to 5c, delivered.
Manila, wood, 2.30 to 3c, delivered.
Kraft, No. 1, (dom.) $3.60 to $3.75, f.o.b. New York.
Kraft, No. 2, (dom.) $3.35 to $3.50, f.o.b. New York.
Boxboards, news, $23 to $26 per ton, delivered.
Wood pulp board, $40 to $42.50 per ton, delivered.
Boxboards, straw, $21 to $24 per ton, delivered.
Boxboards, chip, $22 to $25 per ton, delivered.
Tissue, fourdrinier, 50c f.o.b. New York.
Tissue, white, cylinder, 40c to 42½c, f.o.b. New York.
Kraft, imported, 3.95c to 4c, ex dock, New York.

NEW YORK MARKETS.

New York, N.Y., May 12, 1915.

Owing to the continued lack of adequate rains in the sections where mechanical pulp is manufactured, there seems to be somewhat of a change in the conditions of the market during the past fortnight. Two weeks ago water was plentiful and mills depending on same were enabled to grind all the pulp that they wanted to. Now the situation is entirely different. Rivers and streams are beginning to show the effects of the lack of rains, and in consequence pulp grinding mills are not operating on anything like the same basis as they were a month ago. As a consequence, there has been during the past week many consumers enter the market in the hope of securing additional stocks at current quotations. As a matter of fact, nearly all of the mills in the Eastern States that are compelled to purchase their supplies in the market, have been making inquiries during the interval. It is therefore true that the market is on a much sounder basis than it was when last reported upon. The predictions made in these columns two weeks ago are beginning to materialize, and it is the consensus of opinion among the local dealers that prices during the coming summer months will be proportionate to the high values now being asked in other commercial commodities. It is also the common belief that the coming summer months will witness a severe drought, and that the pulp grinding mills will be severely affected on account of same. As the supply on hand at the mills at the present time is not over-large, there will undoubtedly be a severe shortage in mechanical pulp, which will necessarily cause a decidedly strengthening in price.

The past fortnight has been characterized by quite a heavy movement in the market for chemical pulps. The larger movement, however, has been in the past few days. While it may seem strange to connect the sinking of the British passenger ship Lusitania a few days ago with the chemical pulp situation in the United States, it undoubtedly has had its bearing on the situation, as it has in many other commodities. Local importers are strong in their conviction that the sinking of this ship will cause a decided curtailment in the transportation of pulp from Scandinavian ports. The fact that German submarines are attacking neutral ships without warning is causing insurance rates to soar so high that it is almost impossible to make shipments without a positive guarantee of prices per pound that are almost prohibitive. Inquiries during the interval have been numerous, owing to the stocks on hand at the various consuming points being very low; and importers are in a position to command very high rates—and they are losing no time now in doing so, once they have the opportunity. But the importers—the agents for the Scandinavian makers—are not the ones upon whom blame must be placed, for they are only carrying out the orders of their "superiors" abroad, who are now leaving no stone unturned in taking advantage of the situation now prevailing in demanding exorbitant prices for the various grades of chemical pulp. Their position seems augmented by the fact that many of the American consumers have rather low stocks on hand at present, and have had to enter the market for spot shipments with special requests for "rush."

Importations of rags and paper stocks in general have been comparatively small during the interval. Importers have been offering certain parcels at very good figures, but as American consumers appear to have a fairly good supply on hand, sales have not been very heavy. Ordinarily when importations are light there is a fairly good demand for domestic stocks, but all grades seem to have been accumulating of late, and the majority of packers report that they have a plentiful supply of all grades on hand. As far as prices are concerned, there is practically no market. Packers as a matter of fact are taking almost anything in order to make room for the fast accumulating collections. This applies to all grades of rags and waste papers. As far as bagging is concerned, the situation is somewhat different. The various grades in bagging are steadily improving and the market in general is growing stronger. Considerable interest is being manifested by the consumers, and the situation is very favorable if compared with the conditions prevaliing several months ago. Owing to the general scarcity of this commodity the tendency is decidedly in favor of advanced prices.

The opening weeks in May have shown an improvement in the local paper trade. Manufacturers and dealers are universal in their opinion that the situation has shown remarkable improvements, compared with the first three months of the year. As reported from time to time in the Pulp and Paper Magazine, the market has shown steady improvement, but the interval just passed probably reflects the most marked if taken collectively. A careful canvas of the local manufacturers and dealers by your correspondent shows that the finer grades of paper appear to be in the greatest demand. Writings, Bonds, Linens, and Ledgers are moving in fairly good volume for this time of the year; with prices being held on a good basis. Book papers, too, are reflecting exceptionally good volume and the general movement is well within the requirements of the average consumer. Fibre and manila papers, on the other hand, are inclined to be quiet. Sales do not come up to the expectations of the manufacturers, and as stocks are gradually increasing, prices are inclined to be weak. This same situation prevails in the tissue market. White and Manila tissues are selling under competition, and prices are very unstable. As a matter of fact the market has not yet recovered from the slump it took a couple of months ago. Recently when manufacturers slashed prices and competed for business, jobbers took advantage of the opportunity and stocked heavily. Therefore now, when the same manufacturers have virtually disposed of their extra stocks they are unable to do business with jobbers, who claim they have plenty of supplies on hand for the present at least. This situation tends to make the market rather weak, as far as the prices are concerned. The newsprint situation is particularly interesting at present. It was thought that manufacturers were beginning to realize that there was no profit in continued price cutting; but it seems that the practice still prevails, as all sales during the past interval have been subjected to a very keen competition. The general curtailment of expenses throughout the country has caused a cessation of advertising, and in consequence newspapers and periodicals have reduced their size. This naturally has had its direct bearing upon the news market, and stocks have been accumulating monthly . The heavy surplus has, therefore, caused the continued competition, and at present there seems to be no end in site. Kraft papers are quiet and uninteresting, while Bogus is moving in a small way only. Boards have not yet recovered either in price or demand, though it is the common belief of many local dealers and manufacturers that this situation cannot long prevail.

No. 1 soft white shavings, $1.85.
No. 1 mixed shavings, 45c.
White blanks, 97½c.
Heavy ledger stock, $1.60.
Ordinary ledger stock, $1.30.
No. 2 book stock, 50c.
No. 1 book stock, 85c.
No. 1 Manila envelope cuttings, $1.25.
No. 1 print Manilas, 70c.
Folded News, 40c.
Over issues 45c.
No. 1 cleaned mixed paper, 30c.
Old white cotton, $1.90.
No. 1 white shirt cuttings, $5.00.
Black overall cuttings, $1.70.
Thirds, blues, $1.30.
Black linings, $1.75.
New light flannelettes, $4.25.
Ordinary satinets, 90c.
Flock, $1.00.
Tailor rags, 85c.
Manila rope, 2½.
No. 1 burlap bagging, $1.00.

Quotations f.o.b. Montreal are:—

Book—News—Writing and Posters.

Roll News, $40 to $43 per ton for large orders; $45, to $50 per ton for small orders.
Ream News, $45 to $47 per ton for large orders; $50 to $60 per ton for small orders.
No. 1 Book, 5¼c to 5¾c per lb.
No. 2 Book, S.C., $4.50 to $4.75 in large quantities; $4.75 to $5.50 in small quantities.
No. 3 Book, M.F., $4.00 to $4.25 in large quantities; $4.40 to $4.50 in small quantities.
Writings, 5c to 7½c.
Sulphite Bond, 6½c to 8½c.
Writing Manila, 5c.
Colored Posters, 4½c to 5¼c per lb.

Wrappings.

Grey Brown, per 100 lbs., car lots, $2.25 net; 5 tons $2.45; 2 tons, $2.55; 1 ton, $2.65; less, $2.75.
Red Brown, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, $3.15; less $3.25.
B. Manila, car lots, 2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, $3.15; less, $3.25.
No. 2 Manila, car lots, $3.10; 5 tons, $3.20; 2 tons, $3.30; 1 ton, $3.40; less, $3.50.
No. 1 Manila, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton, $3.65; less $3.75.
Kraft, $3.75 to $5.00.
Fibre, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton, $3.65; less, $3.75.
Fibre, $2.75 to $3.50.
Manila, B., $2.50 to $3.25.

On large orders to the jobbing trade some manufacturers are quoting 10 per cent off the above prices on wrapping.

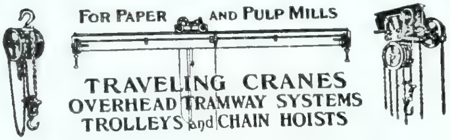
Pulp.

Sulphite easy bleaching, $43 to $45 per ton.
News quality, $41 to $42 per ton.
Bleached sulphite, $54 to $59 per ton.
Kraft pulp, $3.60 to $4.00.
Ground wood, No. 2, $22 to $24, delivered in United States.

John R. Barber, of Georgetown, Ont., the veteran paper manufacturer, is able to be around again after his recent illness.

It is expected that the new news mill of the Abitibi Pulp and Paper Company at Iroquois Falls, Ont., will have one of the four paper machines, which are being erected for the company, in operation about the middle of next month. E. Sheehan, who is superintendent of the plant succeeding William Whyte some time ago, is widely known as a paper maker having had an extended experience in Pacific Coast mills. M. J. Lahey is the resident engineer representing George F. Hardy of New York City. The ground wood plant is now turning out 205 tons of pulp daily.

HUGH R. BLETHEN
21 Park Row, NEW YORK, N. Y.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Meeting of The Technical Section

Announcement is made by the Council of Technical Section of the Canadian Pulp and Paper Association that the Organization meeting following the preliminary meeting in Ottawa on February 12th, will be held in Montreal on June 19th. The principle business of the meeting, will be to receive and discuss the Constitution as outlined by the Council in its meeting on March 5th.

It is proposed to begin the meeting at 9.30 in the morning, in an auditorium in the Chemistry Building of McGill University, which has been placed at the disposal of the section by the University authorities. After the conclusion of business, all those attending may inspect the Forest Products Laboratories. In the afternoon, beginning at 2 o'clock, technical papers will be presented. It is expected that there will be two or three papers, one of which has been definitely announced. The staff of the Forest Products' Laboratories will discuss Papermaking Fibres with special reference to wood and rag. This paper will be illustrated with lantern slides and samples, and will be quite exhaustive. It is expected that the delegates will have dinner together at a place to be designated later, with one or two short informal speeches. The evening will be given over to amusements as suits the tastes of individual delegates.

The date of the meeting will permit those attending to see the City on the following day, and lose very little time from the mill.

Invitations will be sent to individual members of mill staffs as far as names are obtainable, but all those interested in the formation of the Technical Section, and the advancement of the best principles and practices of the industry, are cordially invited to attend.

The Forest Products Laboratories, No. 700 University Street, will be the rendezvous for all attending.

A New Association

The Canadian dealers in paper may consider themselves indebted to Mr. John Martin, President of the John Martin Paper Company of Winnipeg, for the first step which has been taken towards the formation of an Association of Paper Jobbers in the Dominion of Canada. Mr. Martin in a letter to the trade throughout the Dominion has drawn attention to the fact that the National Paper Trade Association of the United States has, during its eleven years of existence, done a great deal to make the business of paper dealing pleasant and profitable through the unifying of trade customs, price lists and sales, and in establishing credits and the system of terms and discounts which form so important a part of the paper dealer's everyday life. Mr. Martin points out that the mills of the Dominion are cooperating to secure common advantages and urges that the paper dealers could do similar work.

It would appear that this step is one for which the forty or fifty paper jobbing houses in Canada have been waiting. If the move is followed up with care and enthusiasm, there is no doubt that the men who handle paper can attain quite the success that has waited upon their brethren in the manufacturing field. It has been demonstrated in the case of the Canadian Pulp and Paper Association that the new spirit of cooperation, which is doing so much for industry the world over, needed only the assurance that mills were willing to come together on a few matters of primary importance, to bring about the organization of a strong progressive movement, which will place the interests on a higher plane than the industry has hitherto known.

Some day there will be an alignment of the interests of the manufacturer, the handler, and the large consumer, to the end that all unnecessary expense may be reduced, and all unprofitable competition eliminated. In the meanwhile, there is much work for such an organization as Mr. Martin proposes, and paper dealers will do well to support the proposal.

The St. Maurice Dam.

Canadian industrial progress has received an impetus in the decision of the Quebec Provincial Government to proceed with the storage dam on the St. Maurice River. It will be remembered that this project was delayed last summer, and the final step of calling for the tenders put off until the plans should be complete.

Already rich in industries, the St. Maurice valley will become, by means of this new dam, one of the most productive regions in America. The power which runs several of the largest pulp and paper enterprises in Canada will now be guaranteed for all the year round. The new developments which have been planned and already partly completed at Grand Mere, making available about 180,000 horse power, will now be doubly sure of permanency. Montreal's street lighting and electric companies will have ample resources of electrical energy to draw upon to safeguard the interests of many years. New enterprises can be easily accommodated in the industrial centres between the line of the National Transcontinental and Montreal.

The dam will be situated at La Loutre, about 100 miles north of the new railway development, will be over 1,000 feet long, and over 85 feet high at the deepest part. The area to be flooded will constitute one of the greatest reservoirs in America.

The awarding of tenders will be watched with the greatest of interest. We sincerly trust that the work will be carried on without mishap, and that Canada will have as good reason to be proud of the finished enterprise as she has of the plan on paper.

Canada's Newest Merger

In this issue we have the privilege of reciting some of the details of the career of Mr. J. E. A. Dubuc, who is the moving spirit of the new merger which is bringing together three Canadian pulp mills, some very large pulpwood limits, and a paper mill in the United States. Mr. Dubuc has worked hard and long over his project, and now that it is complete, Canadians will congragulate him and wish him well.

His move is one fraught with the greatest difficulty. The history of large pulp and paper corporations owning mills in various parts of the country is not on the whole, encouraging. Overhead charges, instead of decreasing, as might be reasonably expected, seem for some reason or other, to increase the burden upon the whole concern. One mill often develops into an incubus upon another in the amalgamation. The difficulties of reconciling the peculiarities of all the mills and their staffs to a single standard, are well-known to mill men.

Mr. Dubuc has shown great initiative and financial ability in the task of bringing his corporation together. The "Pulp and Paper Magazine" wishes the concern the best of fortune in its varied activities. May it pay dividends like those of our railroad friends, and if the time should ever come at which it is deemed wisest to have the component mills resume their old status, may the Standard Oil Company have nothing to brag about.

Pulpwood Consumption

For the excellent bulletin on the consumption of pulpwood in the Dominion in 1914, the pulp and paper industry is indebted to Mr. R. H. Campbell, Director of the Forestry Branch Department of the Interior, Ottawa. The work of compilation of forest products bulletins, which have been of inestimable service in giving Canadians a clear idea of our wood-using industries, has fallen to Mr. R. G. Lewis. Mr. Lewis is a graduate of the Faculty of Forestry, University of Toronto, and has specialized in this branch of investigation for three years. W. Guy H. Boyce has capably assisted in the work.

The figures which Mr. Lewis has collected for 1914 show that steady growth has characterized the pulp and paper industry. Home consumption of pulp is increasing, as are also exports of finished product. For a short period after the declaration of war, prices of chemical pulp were such as to raise the average export value for 1914 over that of 1913. Otherwise, unfortunately, the prices of woodpulp were less.

PULPWOOD CONSUMPTION, 1914

Bulletin of Forestry Branch, Ottawa, Shows Steady Growth in Pulp Industry.

The information in this bulletin was compiled from reports received from forty-nine firms or individuals operating pulpmills in Canada during 1914. These forty-nine firms operated altogether sixty-six mills distributed as follows:—Quebec, 23 firms operating 31 mills, Ontario 15 firms operating 21 mills, Nova Scotia, 5 firms operating 7 mills, New Brunswick 4 firms operating 4 mills and British Columbia 2 firms operating 3 mills. Five mills operating in 1913 were idle in 1914. Four newly-completed mills commenced operations in 1914 and two mills previously idle resumed operations during that year.

In addition to active mills, reports were received from 11 firms whose mills were idle in 1914, and from 2 firms with mills under construction.

The sixty-six active pulpmills in Canada in 1914 consumed altogether 1,224,376 cords of pulpwood, valued at the mill at $8,089,868. In addition to this home consumption a total quantity of 972,508 cords valued at $6,680,490 was exported in the unmanufactured state from Canada to the United States making altogether a total production of pulpwood of 2,196,884 cords valued at $14,770,358.

Pulpwood

Table 1 gives the details of the consumption of pulpwood in Canadian mills in 1913 and 1914 by provinces.

In spite of the widespread disturbances to industry in general occasioned by the war, the manufacture of wood pulp in Canada is still on the increase. During the calendar year 1914 the quantity of wood used in this industry showed an increase of 10.4 per cent. over the preceding year. The inserted diagram shows graphically the steady increase in the quantity of wood used in this industry in the past five years.

The increase from 1910 to 1911 was 12.3 per cent, from 1911 to 1912, 28.8 per cent, from 1912 to 1913, 28.1 per cent and from 1913 to 1914, 10.4 per cent. The relative positions of the five provinces on the list remained the same as in 1913. Increases took place in the consumption of wood for this purpose in Quebec (1.0 per cent) and Ontario (39.4 per cent). Over four-fifths of the wood consumed in Canada was made into pulp in these two provinces. Decreases in consumption were reported from the three remaining provinces as follows:—British Columbia (4.9 per cent), New Brunswick (7.1 per cent), and Nova Scotia (47.6 per cent).

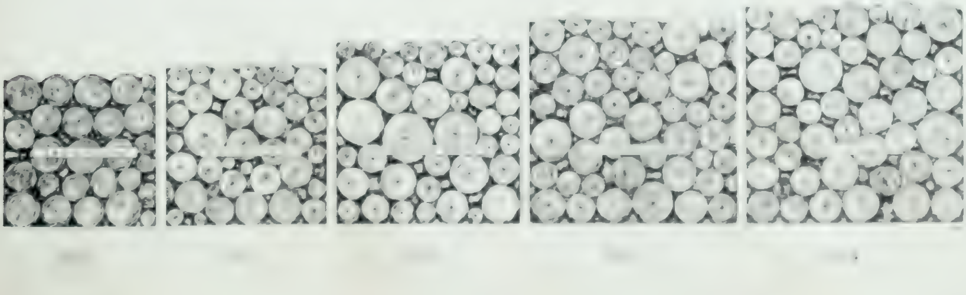
The average value of pulpwood at the mills in 1914 was $6.61, an advance of only a few cents on the value reported for 1913. The value increased in British Columbia, remained the same in Quebec and decreased elsewhere.

TABLE I.

Pulpwood, 1913 and 1914, by Provinces: Quantity Used and Total Value 1914, Average Value 1913 and 1914, and Per Cent Distribution, 1914.

PROVINCES	No. of Active Firms Reporting	QUANTITY		Per Cent Distribution	Total Value	Average Value Per Cord	
		1913	1914	1914	1914	1913	1914
		Cords	Cords		$	$ c.	$ c.
CANADA	49	1,109,034	1,224,376	100.0	8,089,868	6.53	6.61
Quebec	23	629,934	636,496	52.0	4,148,405	6.52	6.52
Ontario	15	321,244	447,751	36.6	3,172,235	7.15	7.08
British Columbia	2	84,173	80,013	6.5	426,444	4.77	5.33
New Brunswick	4	53,121	49,339	4.0	296,769	6.44	6.01
Nova Scotia	5	20,562	10,777	0.9	46,015	4.61	4.27

CONSUMPTION OF PULPWOOD IN CANADA, 1910-1914.



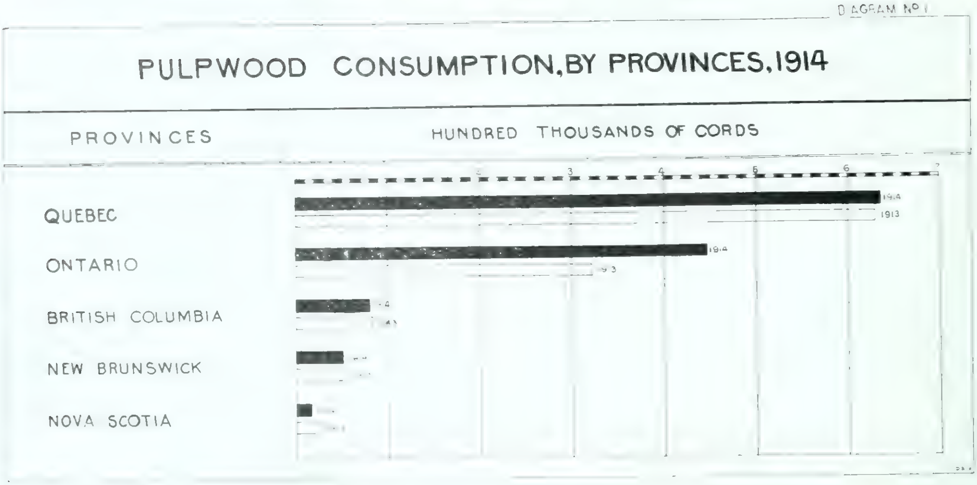


TABLE II.

Pulpwood, 1913 and 1914, by Kinds of Wood: Quantity Used and Total Value 1914, Average Value 1913 and 1914, and Per Cent Distribution, 1914.

KINDS OF WOOD	No. of Active Firms Reporting	QUANTITY		Per Cent Distribution	Total Value	Average Value Per Cord	
		1913	1914	1914	1914	1913	1914
		Cords	Cords		$	$ c.	$ c.
Total	49	1,109,034	1,224,376	100.0	8,089,868	6.53	6.61
Spruce	49	754,858	836,387	68.3	5,605,926	6.76	6.70
Balsam Fir	35	283,292	314,183	25.7	2,067,434	6.38	6.58
Hemlock	5	47,360	45,246	3.7	254,576	4.25	5.63
Jack Pine	3	19,383	24,715	2.0	135,762	5.25	5.49
Poplar	3	4,141	3,845	0.3	26,170	7.02	6.81

The woods most commonly used in pulp manufacture in Canada vary but slightly from year to year. The increased manufacture of sulphate or kraft pulp has enabled the manufacturers to use increasing proportions of jack pine. The use of balsam fir has increased steadily in past years. Hemlock is used to a greater extent than any other wood in British Columbia. In every other province but British Columbia spruce heads the list of woods converted into pulp.

It might be well to explain that the five woods listed in the above table are in reality groups of species. Spruce pulpwood in the Maritime Provinces is composed mostly of red spruce (Picea rubra), a tree whose distribution is confined to this region in Canada. With this are mixed smaller quantities of white spruce (Picea canadensis) and black spruce (Picea mariana).

In Ontario and western Quebec the red spruce is almost unknown and forms only a small part of the wood used in pulp manufacture. White spruce grows in Canada from the Atlantic to the Yukon and is undoubtedly the most important pulp species in the forests of this country. It probably forms 90 per cent of the spruce pulpwood cut in Ontario and Quebec. Smaller quantities of black spruce and red spruce are also cut. In British Columbia the place of these three eastern spruces is taken by typical British Columbia species. The spruce pulpwood produced in this province at the present time is cut in the coast region, and is the wood of the Sitka spruce (Picea Sitchensis). The Engelmann spruce of the Selkirks and the Rocky Mountains (Picea Engelmanni) is not utilized for this purpose at the present time, not because of its lack of satisfactory pulp producing qualities, but simply because the pulp industry has not been developed in Interior British Columbia.

In Eastern Canada only one species of balsam fir occurs, and this tree (Abies balsamea) forms the entire production of balsam fir pulpwood in Ontario, Quebec, New Brunswick and Nova Scotia. In British Columbia the most commonly used balsam fir species are amabalis fir (Abies amabilis) and lowland fir (Abies grandis). In the interior of the province and on the Rocky Mountain slopes the common species is mountain fir (Abies lasiocarpa), which has a similar distribution to Engelmann spruce and, like it is not used for pulp at the present time.

Eastern hemlock (Tsuga canadensis) is not used extensively in the East for pulp manufacture, although it is reported from Ontario, Quebec and Nova Scotia. The western species (Tsuga heterophylla) is the most important pulpwood in British Columbia at the present time, and forms almost half of the wood used in that province. It is said to be immensely superior to the eastern species for pulpwood, as well as for lumber and other products.

Jack pine (Pinus Banksiana) is used only in Quebec and Ontario, and only in the manufacture of sulphate or kraft pulp. Poplar is also used only in Quebec and Ontario, but is made into groundwood pulp, sulphite and kraft fibre. Two species are utilized, aspen poplar (Populus tremuloides) forming the greater part of the pulpwood consumed and balsam poplar (Populus balsamea) being used in smaller quantities. Common cottonwood (Populus deltoides) and large toothed aspen (Poplus grandidentata) are probably also used occasionally. Pulp manufactured from the wood of the poplar species lacks the high tensile strength of that made from spruce, balsam fir and other coniferous woods and is used chiefly to give body to book and magazine paper. Mixed with a stronger coarser pulp it fills in the interstices between the coarser fibres and makes the paper smooth and opaque.

The proportion of wood used in the manufacture of chemical fibre in Canada is steadily increasing. In 1910 only 22 per cent of the wood was converted into pulp by the chemical processes. In 1914 this propor-

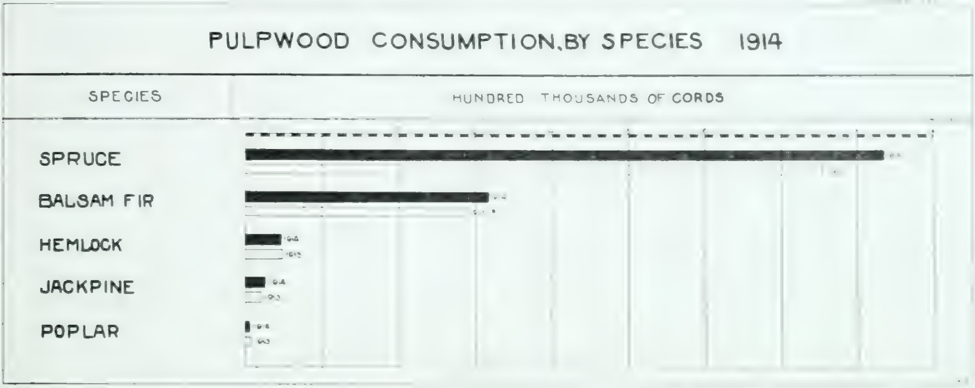
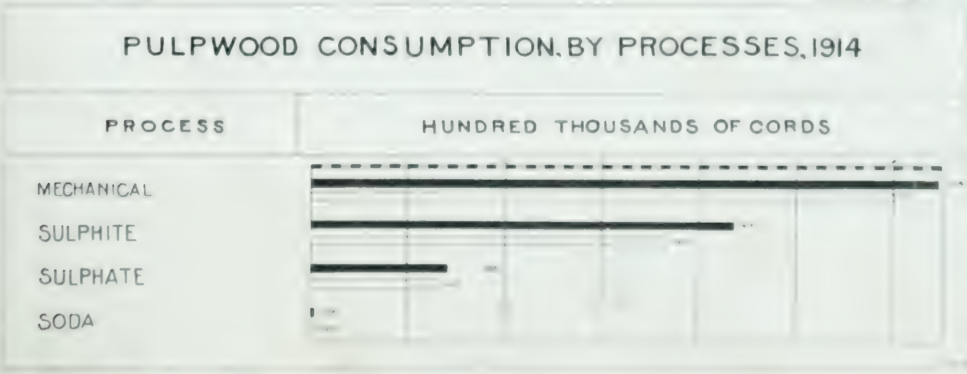

PULPWOOD CONSUMPTION. BY SPECIES 1914

TABLE III.

Pulpwood, 1913 and 1914, by Processes: Quantity Used and Total Value 1914, Average Value 1913 and 1914, and Per Cent Distribution, 1914.

PROCESSES	No. of Active Firms Reporting	QUANTITY		Per Cent Distribution	Total Value	Average Value Per Cord	
		1913	1914	1914	1914	1913	1914
		Cords	Cords		$	$ c.	$ c.
Total..	49	1,109,034	1,224,376	100.0	8,089,868	6 53	6 61
Mechanical	40	600,216	644,924	52 7	4,424,067	6 59	6 86
Sulphite	12	367,105	435,101	35 5	2,941,099	6 40	6 76
Sulphate	6	136,569	140,666	11 5	698,207	6 65	4.96
Soda	1	5,144	3,785	0 3	26,495	6 05	7.00


PULPWOOD CONSUMPTION. BY PROCESSES. 1914

[illegible] and increased to 47.3 per cent, almost half the total.

In the mechanical process where the fibres are more or less broken and their strength impaired, only the best quality of pulpwood can be used. The machinery, however, is comparatively cheap and easily installed, and as long as the supply of good pulpwood was convenient this process is largely used. Of late years, the quantity of wood used in the sulphite process has steadily increased in spite of the high cost of installing the necessary plant. In this process the wood requirements are not so exacting, and the higher price for the pulp produced easily repays the cost of the plant.

The introduction of the sulphate or kraft process for the manufacture of coarse, strong, dark-colored pulp for wrapping papers has permitted the use of jack pine and other so-called inferior species in a greater proportion than had hitherto been possible.

In 1913 the wood used in the mechanical process for the manufacture of ground-wood pulp formed 54.1 per cent of the total consumption. This proportion was reduced to 52.7 per cent in 1914. The proportion in the case of sulphite pulp increased from 33.1 to 35.5 per cent, but a decrease took place with the sulphate or kraft process from 12.3 per cent to 11.5 per cent. The only actual decrease in quantity was in the case of wood used in the soda process.

Table 4 gives the same information as that contained in tables 1, 2 and 3, but in a different form, showing more of the individual details of the consumption of wood in pulp manufacture. The average values given are values at the mill, and as these are affected by

TABLE IV.

Pulpwood, 1914, by Provinces, Kinds of Wood, and Processes: Number of Active Firms Reporting, Quantity of Pulpwood Used, Quantity of Pulp Produced, Quantity of Each Kind of Wood Used in each Process, Total Cost, and Average Cost per Cord.

		Total	Quebec	Ontario	British Columbia	New Brunswick	Nova Scotia
Number of Active Firms Reporting.		49	23	15	2	4	5
Pulp Produced:							
Aggregate	tons	934,700	515,409	325,233	56,352	26,829	10,777
Mechanical	"	644,924	394,321	202,715	32,692	4,319	10,777
Sulphite	"	217,550	56,503	115,877	23,660	21,510	....
Sulphate	"	70,333	62,692	6,641		1,000	..
Soda	"	1,893	1,893			..	..
Wood Used:							
Aggregate	cords	1,224,376	636,496	447,751	80,013	49,339	10,777
Aggregate Cost		$8,089,868	$4,148,405	$3,172,235	$426,444	$296,769	$46,015
Average Cost		$6.61	$6.52	$7.08	$5.33	$6.01	$4.27
Spruce:							
Total	cords	836,387	404,290	358,988	21,637	41,895	9,577
Total cost		$5,605,926	$2,683,759	$2,508,748	$116,143	$255,125	$42,151
Average Cost		$6.70	$6.64	$6.98	$5.37	$6.09	$4.40
Mechanical	cords	449,162	258,997	168,897	8,816	2,875	9,577
Sulphite	"	302,211	67,592	184,778	12,821	37,020	...
Sulphate	"	81,797	74,184	5,313	...	2,000	...
Soda	"	3,217	3,217			...	...
Balsam Fir:							
Total	cords	314,183	211,943	75,218	18,604	7,444	974
Total cost		$2,067,434	$1,337,902	$587,003	$97,699	$41,644	$3,186
Average cost		$6.58	$6.31	$7.80	$5.25	$5.59	$3.27
Mechanical	cords	181,957	135,324	33,318	10,897	1,444	974
Sulphite	"	99,621	44,014	41,900	7,707	6,000	
Sulphate	"	32,037	32,037				..
Soda	"	568	568	..			...
Hemlock:							
Total	cords	45,246	172	5,076	39,772		226
Total cost		$254,576	$688	$40,608	$212,602		$678
Average cost		$5.63	$4.00	$8.00	$5.35		$3.00
Mechanical	cords	13,205			12,979		226
Sulphite	"	31,869		5,076	26,793		..
Sulphate	"	172	172				
Jack Pine:							
Total	cords	24,715	16,746	7,969			
Total cost		$135,762	$103,886	$31,876			
Average cost		$5.49	$6.20	$4.00			
Sulphate	cords	24,715	16,746	7,969			
Poplar:							
Total	cords	3,845	3,345	500			
Total cost		$26,170	$22,170	$4,000			
Average cost		$6.81	$6.63	$8.00			
Mechanical	cords	500		500			
Sulphite	"	1,400	1,400				
Sulphate	"	1,945	1,945				

so many factors, they cannot be taken to represent the intrinsic value of the material in each case. Mills on the Niagara Peninsula, for instance, pay much higher transportation charges on their raw material than those situated in the heart of the pulpwood regions of Quebec. Many mills own their own limits, and put a value on their raw material of little more than the bare cost of cutting and transporting it from the woods to the mill. Many firms, specially in Ontario, buy pulpwood in the open market.

The figures for pulp production are based on the assumption that one cord of wood will produce one ton of ground-wood pulp, and one-half ton of chemical fibre, air dry. (Air dry pulp is assumed to contain 10 per cent of moisture.)

The estimated quantity of wood-pulp manufactured was 934,700 tons, an increase over 1913 of 9.4 per cent. The increase in the manufacture of ground-wood pulp was only 7.4 per cent, while that of pulp produced by the three chemical processes was almost 14 per cent. Considering these three processes separately, it is seen that the increase was in the case of sulphate pulp amounting to 11.8 per cent of the production in 1913. The quantity of soda pulp estimated was a decrease of over a third from 1913.

*Mechanical pulp is manufactured in all five provinces, Quebec leading with over sixty per cent of the total. Sulphite pulp is manufactured in every province but Nova Scotia. Ontario leads in the production of this class of fibre with 53.3 per cent. Sulphate or kraft fibre is manufactured in Quebec, Ontario and New Brunswick, Quebec producing almost ninety per cent of the total. Soda pulp is produced only in Quebec Province.

The figures in the above table for exports of pulpwood were obtained from the Department of Customs for the calendar years 1913 and 1914. It is interesting to note the steadily increasing proportion of the pulpwood manufactured in Canadian mills. In 1910 only a little more than one-third (38.8 per cent) of the pulpwood cut in our forests was manufactured into pulp in our own mills, in 1911 this had increased to 44.2 per cent, in 1912 to 46.9 per cent, in 1913 to 51.7 and in 1914 to 55.7 per cent, well over half of the total. There was also a decrease in the actual quantity of raw pulpwood exported from Canada in 1914, as compared to 1913 of some 62,522 cords. While this condition of affairs may not be entirely satisfactory to the American pulp companies who rely to a large extent on the forests of Canada for their supply of raw material, it is gratifying to note the fact that this form of forest product is becoming more thoroughly appreciated in Canada.

In Ontario by an Order-in-Council, dated January 18th, 1900, regulations were made by which the exportation of spruce and other woods suitable for pulp, cut on lands of the Crown was prohibited. Recently, in certain districts that were burned over, there were quantities of pulpwood which would have been destroyed unless speedily cut and marketed, and as the market for pulpwood was poor, it was suggested that the "manufacturing condition" to which all sales and licenses had been subjected was suspended for the season of 1914 and again for 1915.

In the Province of Quebec an article in the regulations says that all timber cut on Crown Lands in the province must be manufactured in Canada. This regulation came into force on April 26th, 1910. The regulation was changed during the last year so as to [illegible] Great Britain if shipped during the past season of navigation.

TABLE V.

Canadian Pulpwood Exported Unmanufactured vs. That Manufactured in Canada, 1913 and 1914: Quantity, Average Value per Cord and Percent Distribution.

	1913				1914			
	Quantity	Value	Value per Cord	Per Cent	Quantity	Value	Value per Cord	Per Cent
	Cords	$	$ c.		Cords	$	$ c.	
CANADA:								
Production	2,144,064	14,313,939	6 68	100.0	2,196,884	14,770,358	6 72	100
Manufacture	1,109,034	7,243,368	6 53	51.7	1,224,376	8,089,868	6 60	55.7
Export	1,035,030	7,070,571	6 83	48.3	972,508	6,680,490	6 87	44.3
Quebec:								
Production	1,432,594	9,495,165	6 63	100.0	1,323,917	8,882,899	6 71	100
Manufacture	629,934	4,107,689	6 52	44.0	636,496	4,148,405	6 52	48.1
Export	802,260	5,387,476	6 71	56.0	687,421	4,734,494	6 77	51.9
Ontario:								
Production	405,943	2,822,859	6 95	100.0	587,494	4,020,510	6 84	100
Manufacture	321,244	2,297,389	7 15	79.1	447,751	3,172,235	7 08	76.2
Export	84,699	525,470	6 20	20.9	139,743	848,275	6 07	23.8
New Brunswick:								
Production	194,674	1,449,525	7 45	100.0	193,126	1,382,315	7 16	100
Manufacture	53,121	342,243	6 44	27.3	49,339	296,769	6 01	25.5
Export	141,553	1,107,282	7 82	72.7	143,787	1,085,546	7 55	74.5
British Columbia:								
Production	84,242	402,428	4 78	100.0	80,013	426,444	5 33	100
Manufacture	84,173	401,218	4 77	99.9	80,013	426,444	5 33	100
Export	69	1,210	17 54	0.1				
Nova Scotia:								
Production	26,611	143,962	5 41	100.0	12,334	58,190	4 72	100
Manufacture	20,562	94,829	4 61	77.3	10,777	46,015	4 27	87.4
Export	6,049	49,133	8 12	22.7	1,557	12,175	7 82	12.6

TABLE VI.

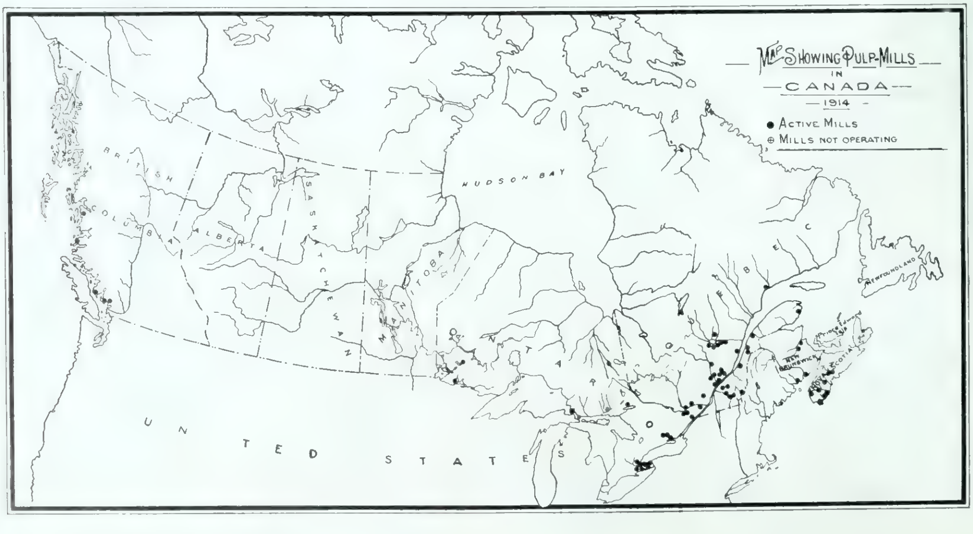
Export of Wood Pulp, 1913 and 1914: Quantity, Total Value, Average Value Per Ton, Percent Distribution and Countries to which Exported.

Kinds of Pulp and Countries to which Exported	1913				1914			
	Quantity	Value	Average Value Per Ton	Per Cent	Quantity	Value	Average Value Per Ton	Per Cent
	Tons	$	$ c.		Tons	$	$ c.	
Wood-pulp exported aggregate	298,169	5,913,560	19.83	100.0	424,883	8,865,436	20.87	100.0
Total Mechanical Pulp	230,644	3,317,565	14.38	77.4	314,485	4,509,260	14.34	74.0
Total Chemical Pulp	67,525	2,595,995	38.44	22.6	110,398	4,356,176	39.46	26.0
Total to United States	198,110	4,471,939	22.57	66.4	295,674	7,008,312	23.70	69.6
Mechanical	137,922	2,150,227	15.59	.....	190,095	2,832,909	14.90	...
Chemical	60,188	2,321,712	38.57	.....	105,579	4,175,403	39.55	..
Total to Great Britain	92,916	1,172,750	12.62	31.2	116.843	1,581,101	13.53	27.5
Mechanical	92,722	1,167,338	12.59	.....	116,820	1,580,301	13.53	...
Chemical	194	5,412	27.90	.....	23	800	34.78	....
Total to France	......	......	.....	.....	7,612	97,475	12.81	1.8
Mechanical	......	......	.....	.....	7,659	96,050	12.69	.....
Chemical	......	......	.....	.....	43	1,425	33.14	.....
Total to Japan	7,031	265,071	37.70	2.4	4,755	178,548	37.55	1.1
Chemical	7,031	265,071	37.70	.....	4,755	178,548	37.55	.....
Total to China	112	3,800	33.93	.....	....	....	.....	....
Chemical	112	3,800	33.93	.....	......	......	..	.....

TABLE VII.

Imports of Wood Pulp, 1913 and 1914: Total Value, Percent Distribution, and Countries from which Imported.

Countries From Which Imported	1913		1914	
	Value	Per Cent Distribution	Value	Per Cent Distribution
	$		$	
Total Value of Imports	356,862	100.0	424,601	100.0
United States	303,543	85.1	216,361	51.0
Sweden	36,843	10.3	136,540	32.2
Norway	1,387	0.4	61,254	14.4
Switzerland	1,006	0.3	5,285	1.2
Great Britain	10,197	2.8	4,375	1.0
Austria-Hungary	....	....	786	0.2
Germany	3,886	1.1	....	....



Similar legislation was passed in New Brunswick on April 26th, 1911, which was similarly amended with respect to pit props by an Order-in-Council dated October 15, 1914.

There are no statutes prohibiting or regulating the export of pulpwood from the provinces of Nova Scotia or British Columbia.

During 1914 Canada exported 126,714 tons more of manufactured wood-pulp than in 1913, an increase of 42.5 per cent. While the increase in the exportation of ground wood was 36.4 per cent, that of chemical fibre was 63.5 per cent. This increase is partly due to the general advance of the industry in Canada and partly to the fact that while the capacity of pulp mills has increased in the last year the paper industry has not kept pace with the supply of pulp, and the surplus of manufactured fibre has found a market in other countries. The United States has been our most important purchaser of pulp in the past, and the proportion of Canadian pulp exported to that country in 1914 was almost seventy per cent of the total. Great Britain also buys large quantities of Canadian wood pulp, and these two countries together usually take the bulk of the exports from Canada. France imported Canadian pulp in 1914 for the first time since 1910. Other countries, including Belgium, Mexico, Australia, Cuba, New Zealand and Newfoundland, have imported small quantities of wood pulp from Canada in the last five years, but the trade with these countries has varied greatly from year to year. The average price of exported wood-pulp changed very slightly. That of ground-wood pulp decreased by a few cents, and that of chemical fibre increased by about one dollar a ton.

In spite of the fact that Canada in 1914 produced nearly a million tons of wood-pulp valued at approximately twenty million dollars, and exported pulp to the value of over eight million dollars, we still import this commodity from other countries. The importations of wood-pulp in 1914 were valued at $426,601, an increase over the imports of 1913 of 19 per cent. Although the greater part of the material comes from the United States (51 per cent) the value of imports from that country decreased by $87,182 in 1914. A decrease took place in the value of imports from Great Britain and no pulp was imported from Germany, but increases are to be noted with the other countries on the list, especially Sweden.

THE TESTING OF MATERIALS USED IN PAPER MILLS

Of all the various materials used in connection with the manufacture of paper there are but few which cannot in some manner be tested so as to ascertain the efficiency or economy resulting from their use.

There is much truth in "Experience is the best teacher," but in the majority of cases the experience is limited to such an extent that there is a tendency to adhere to the old fashioned ideas rather than run any risk in adopting new methods, etc.

It is a poor policy to adopt too quickly every new idea that may be proposed and it is equally unwise not to adopt ideas that have been found profitable. The best practice is to submit everything to some kind of a test, so as to prove one way or the other.

Such testing is very broad in its scope and many factors may enter into the final decision so that what may be best to adopt under certain conditions in one mill may not prove best in another.

For example: It may be that at one mill the boiler capacity is ample so that a poor, cheap grade of coal has sufficient fuel value to produce all the steam required and figures out to be the most economical to use, while at another mill the boiler capacity may be limited so that a better grade of coal is not only more economical to use under the circumstances but it is absolutely necessary in order to generate the steam required.

Necessity for Testing. Progress is continually being made long all lines so that it is necessary in order to obtain the best possible results at the lowest cost to test new ideas, etc. Very little reliable information can be obtained from sales agents of various firms, since each agent has his own interests at stake and it is his business to promote the sale of his material. The necessity for testing, therefore, becomes apparent. In a large number of cases the best method is to put the article to practical use and keep accurate record of its service, as in the case of wires, felts, etc. In other cases we have chemical testing, also physical testing as strength of twine, belting, etc.

Meaning of the Word. Testing in the broadest sense means any method or procedure with the object of ascertaining facts about the thing; for example: A car of coal is weighed in order to ascertain its weight more or less than the weight invoiced; that is testing its weight. If a piece of clay is placed in the mouth in order to observe how it feels between the teeth; this is testing its grit. If several felts, wires, etc. are used under the same conditions and a record kept to see which gives the best service, this is testing also.

Weighing. The invoice weights of all kinds of material should be checked by weighing on accurate scales.

Testing Scales. All scales should be periodically tested as to the accuracy of their calculations.

The principle upon which paper is weighed is as follows: One pound = 16 oz. 30 lbs. therefore 30×16 = 480 oz. If therefore the count basis is 480 sheets, one sheet of a 30 lb. paper will weigh exactly 1oz. so that if a test weighing exactly 1 oz. be placed upon the scales instead of a sheet of paper it will register exactly 30 lbs. on the 480 count. On the 500 count basis one sheet of a 30 lb. paper will weigh 480/500 of one oz. or 96/100 of an oz.

When test weights of exactly 1 oz. are placed upon these scales, one after another they should therefore register as follows:

Count	1	2	3	4	5 oz.
480	30	60	90	120	150
500	31 25	62 50	93 75	125	156 25

Test weights in the form of brass strips are supplied for this purpose by the Bureau of Tests.

Measuring. Measuring the dimensions of a thing is also a testing process. Measuring is sometimes connected with weighing as for example in the case of [illegible] exactly 1 lb. may be weighed and measured so as to calculate the weight per 100 sq. ft. and thus get comparative weights for different makes or brands.

Counting is another method as in counting the mesh of a wire with a magnifying glass. It is also connected with weight. By counting the number (as in the case of a roll of belting) of coils in the roll and diameter of the hole in the center, the number of feet may be found. By weighing the roll and 100 ft. the weight of 100 ft. may be found, thus furnishing comparisons as in the case of twine.

Measuring Belting. Calculation of a length of a roll of belting and number of coils is based on the law, the C×D×3.1416, as the roll is a spiral it can be considered as being made up of a number of circles varying in diameter from the smallest inside coil to the largest. The average diameter equals the ½ (largest and smallest) so these two diameters must be measured. In measuring these diameters it is best to measure in several directions and take the average measurements as a roll is usually flattened and the hole in the center is not round. The number of coils or circles × the avg. diameter and then × 3.1416 will give the length of belting in the roll. If the average diameter is in inches the result is in inches and must be divided by 12 to give feet. If for example, a roll contains 52 coils and is 39 ins. in large diameter and 7 in,. small diameter, 39 plus 7 equals 46, which divided by 2 equals 23 mean diameter. 52 coils × 23 equals 1196 in. × 3.1416 equals 3757 divided by 12 equals 313 ft. This seems to be the best way for determining this, and experience has taught that the length never varies more than 1 ft.

Friction Test. By the friction test is meant the rubber composition which binds the pieces of duck or canvas together. This rubber composition is forced into the texture of the canvas by means of friction rolls and thus gets the name of friction.

The various grades of belting depends to a large extent upon the composition of the friction used in their manufacture. The highest grade of pure rubber gives the strongest and most durable friction while recovered rubber and inferior compositions give inferior tests and deteriorate rapidly.

To test—Cut 3 strips smoothly and evenly 1 in. in width, separate the ply for 1 in. or 2 in. by means of a knife in order to separate. Make a mark slightly beyond the point of separation and hang the strip by means of a clamp, etc. Allow the strip to hang naturally. Pull with the hand till you reach the separation mark and catch the time with a watch. The separation should not average more than 1 in. per minute, the average of the three strips being taken. Some grades will only stand 5 or 6 lbs. and are inferior; others will stand weights of 19 or 20 lbs.

Comparisons may be made by using the same weight (14 lbs.) for all belts and calculate the rate of separation. Poor belting will separate quick under a 14 lb. weight. By a systematic method of testing every roll, valuable information can be obtained as to different makes and brands.

The Drying Oven.

Tests for quantity of water or moisture in anything are among the most important class of testing, and a drying oven is an essential part of the equipment in every mill. Among the tests for water or moisture contained in materials, we may mention the following:

Moisture of Pulp.—Pulp, both mechanical and chemical, such as pulp, sulphite, and soda, and in fact any paper making pulp, is tested for moisture and water by taking a sample, weighing it accurately, heating it until bone dry and again weighing it. The loss in weight gives the amount of moisture or water in it contained from the weights observed, and the percentages of water or moisture and the bone dry pulp are easily calculated. It is ordinarily assumed that paper pulp after being dried bone dry and then left exposed to the air will absorb 10 per cent of its weight of moisture from the atmosphere.

This figure, 10 per cent, is a fairly approximate average, but of course the true amount of moisture absorbed from the air depends on the dryness or dampness of the weather, which is constantly changing. At times when the air is very dry a bone dry pulp will not absorb anything like 10 per cent moisture while at other times when the atmosphere is very moist, it will absorb considerably more than 10 per cent. Under ordinary conditions during the year it is nearer to 9 per cent than to 10 per cent, but this again varies with the locality, for one locality during the year is quite different from another.

Calculating on Dry Pulp. In our opinion the true basis for estimating the percentage of air dry material is the bone dry weight, but it makes no difference what percentage is added to this as long as the same percentage is uniformly adopted. Ten per cent is as satisfactory as any, although it may not represent the actual percentage of moisture absorbed in the majority of cases.

Moisture in Paper.—The percentage of moisture in paper can also be readily determined by means of a drying oven. This is a very important test, being of much value in enabling one to regulate the drying of paper on a machine.

Newspaper when over dried is brittle and unsatisfactory, while if too much moisture is left in it the calendering produces a mottled smutty appearance, but the paper takes a superior finish to that which has been overdried. As is well known, the best results are obtained when the paper is run as damp as possible without getting mottled or smutty in appearance. Experiments have shown, in the case of newspaper, that the best degree of moisture is between 9 per cent and 11 per cent on the average 10 per cent.

This is the percentage which is added to "bone dry pulp" to convert it into air dry weight upon which calculations as to "production" and loss of raw material are based.

If paper is run (as is frequently the case) with only 7 per cent of moisture in it and calculations are based upon air dry pulp containing 10 per cent of moisture, there is, of course, a loss of raw material due to the paper being run too dry. By running the paper damper, not only is there a gain in the production, but the quality of the paper that is run on the paper machine is more or less greatly improved.

Another bad effect of over drying lies in the fact that over dried paper will absorb moisture from the atmosphere and increase in weight, so that if a sample of paper fresh from the machine weighs 33 lbs., it might readily take up sufficient moisture to be 34 lbs. when tested by the customer and furnish grounds for complaint as to overweight.

The best method of testing the product of a paper-machine for moisture is to take as large a sample as the scales can conveniently weigh, weigh the sample immediately, and mark the weight on it. Then place it in the drying oven and allow it to remain until bone dry, when it is again immediately weighed and the loss in weight calculated into percentage. If less than 10 per cent, it shows that the paper has been run too dry on the machine. In case of many papers, such as heavy wrappers, much more than 10 per cent of water can be left in the paper. In all cases a sample of such paper will dry out and lose weight upon exposure to the atmosphere.

Moisture in Clay.—The drying oven is also a convenient and accurate appliance for testing the degree of moisture in other substances. The best method for testing clay for moisture is as follows:—

A tin pan is accurately weighed and its weight recorded. It is then filled level with clay and weighed again; the difference in weight is the weight of the clay taken for test. The pan is now placed in an oven until the clay is bone dry and again weighed. The loss in weight is due to water or moisture, and is calculated into percentage.

In this connection it may be safe to state that the clay is a material which not only contains water in the form of dampness or moisture, but also contains some constitutionally or chemically combined water which cannot be expelled by drying in an oven. This water forms a compound part of the clay and is not driven off by the heat of the drying oven or by the dryness of a paper machine, but remains in the clay in the dried paper even if the paper is dried "bone dry."

If some clay is put in a crucible and submitted to furnace heat, as in burning brick, this chemically combined water of constitution is expelled and the clay becomes hard like a brick and will no longer dissolve or "break down" into a fine powder when stirred with water. If pulverized, each small particle is hard and gritty, and not soft and sticky, like an unburnt clay is. It is this fact that renders clay so valuable in pottery manufacture.

The chemically combined water being driven off to the slightest extent in the process of manufacture of paper does not, therefore, enter into consideration at all in making moisture tests. All clay is more or less damp, and it is simply the extent of the dampness which is of importance which is easily determined by drying in an oven same as pulp or paper is dried.

Whatever percentage of dampness or moisture clay contains is so much loss for it is bone dry, when the paper has passed over the dryers in the machine.

The fibres of paper or pulp when bone dry suck up or absorb moisture from the atmosphere, but dry clay may lie exposed to the atmosphere without absorbing any noticeable amount of moisture.

If, therefore, 100 lbs. of damp clay containing 10 per cent moisture are furnished to a ton of paper, the 10 per cent of moisture in the clay is all dried out, and only 90 lbs. of actual clay has been furnished in reality. In testing the percentage of clay by paper all of the above features of clay must be taken into consideration, and a sample of the clay itself must be tested as well as the sample of the paper used in order to obtain the correct and true results.

Testing For Retention of Clay.

In testing for retention of clay in paper the following process is employed:—

1st.—The clay itself is tested for dampness or moisture and the amount of dry clay furnished to the paper is thus calculated.

2nd. The sample of paper is burned and the amount of ash is thus calculated.

3rd. In the burning of the paper to get the percentage of ash the clay in the paper loses its "combined" water so a sample of the clay must also be burned or ignited and the loss in weight which takes place be calculated also and deducted from the ash of the paper.

4th.—Ground wood and sulphite fibre contain some ash, so that the quantity of ash coming from the fibre itself must be estimated and deducted from the total to arrive at the true amount of the clay. The ash of average ground wood and sulphite in the proportions ordinarily used in newspaper is [illegible] per cent.

From these facts it is then possible to calculate accurately the true amount of clay furnished and the true amount in the furnished paper from which, of course the percentage retained is readily calculated.

Moisture in Alum, Soda Ash, Lime, etc.

There are certain materials which absorb water or moisture from the atmosphere or which contain water chemically combined with the other constituents of the substance in such forms of combination that it cannot be dried out again by heating in a drying oven.

Alum, for example, contains a large amount of water which cannot be dried out of it even at high temperatures without decomposing the alum itself. At a high heat the alum melts or fuses without losing much water, and if heated to a still higher degree so as to dry off water the alum is decomposed, and the sulphuric acid is also driven off. There is, therefore, no method for estimating directly the quantity of water in alum. The per cents of all other ingredients can be determined accurately by tests and the water by difference.

Lime also absorbs moisture and carbonic acid from the atmosphere, and becomes more or less "air slacked." Such moisture and acid cannot be driven off from the air slacked lime by heating in an oven, but it can be accurately determined by intense ignition of the lime, as no decomposition takes place, and by ignition an air slacked lime is brought back to the original condition of the freshly burned lime.

Soda ash, like lime, absorbs moisture from the air, and increases in weight, but the water absorbed can only be driven off completely by heating to a dull red heat. Some can be driven off in a drying oven, but not all of it.

Moisture in Coal.

Coal can be dried bone dry in a drying oven. Many times the coal delivered is quite wet, and if cars are weighed a test for moisture is important to decide whether or not full dry weight of the coal is delivered.

In conducting boiler tests the moisture in the coal used must also be determined and allowance made thereof. In determining the capacity of chests, concentration of liquids, stock, etc., it is often desirable to test how much dry stock the liquid contains per cubic foot. This is best accomplished as follows:—

Record the weight of a pie pan on the scales. Take exactly one quart of the liquid stock by means of an accurate quart measure. Pour this into a piece of cotton cloth and squeeze out as much of the water as possible. Transfer the stock from the cloth to the pie pan. Repeat this until the pan is about full, recording the number of quarts necessary.

In the case of thick liquid stock one or two quarts, may be enough while with thin stock a number of quarts must be taken to get a pan full. Care must be taken that no stock is lost during the operation.

The pie pan of wet stock is then placed in the drying oven and allowed to remain until it is bone dry, when it is taken out and weighed. It is well to put in again, then weigh again, so that it is perfectly dry. The bone dry weight is calculated into air dry weight as usual by dividing by 90 and multiplying by 100. This gives the air dry weight of stock in the number of quarts measured out for the test from which the weight of one quart is calculated.

The weight in one quart multiplied by four gives the weight in gallons. The weight in one quart × 30 gives the weight in one cu. ft. as there are 30 quarts to a cu. ft. (exact figures, 29.922 qts.)

Testing Alloys.

This is done by subjecting various alloys to exactly the same conditions, observing the character of service given and keeping careful records of all matters of importance observed.

This method is even better than chemical testing.

FORMATION OF THE TECHNICAL SECTION OF THE AMERICAN PULP AND PAPER ASSOCIATION

At the annual meeting of the American Paper and Pulp Association, held in New York City last February, some thirty-five of the members met and formed a temporary organization for the purpose of launching a new division within the association for the consideration of questions affecting cellulose and paper chemistry, machine design, and the various branches of mechanical and chemical engineering which engage the study of mill operators. Henry E. Fletcher, of the Fletcher Paper Company, Alpena, Mich., who had been most active in the preliminary organization work, was elected temporary chairman of the meeting, with power to form a committee of five to devise a plan of operation. As first named this committee consisted of the chairman and W. G. MacNaughton, of the Nekoosa-Edwards Paper Company, Port Edwards, Wis.; Charles F. Rhodes, of the International Paper Company, Glens Falls, N.Y.; Henry Oberman, of the Hammermill Paper Company, Erie, Pa.; Ernest Mahler, of the Kimberly-Clark Company, Neenah, Wis.; Prof. Ralph H. McKee, of the University of Maine, Orono, Me., who was a member by virtue of being official chemist of the association, and the office having been abolished, his membership in the committee terminated.

The committee met for the first time in Chicago on April 6 under the chairmanship of Mr. Fletcher, Mr. MacNaughton acting as secretary, when a constitution was tentatively adopted, and a subcommittee was appointed to confer with the editor of "Paper" regarding the publication of the proceedings. A committee was also named to consider the question of offering a prize or prizes for competitive essays, and to submit a list of subjects.

In the meantime circular letters had been sent out to the owners of pulp and paper mills throughout the country accompanied by blanks calling for information regarding the men in charge of technical work, such as details of experience, educational training, positions held, both past and present, etc., and the replies as received were tabulated and indexed for the use of the secretary, who was yet to be appointed.

A second meeting of the committee was held in Chicago on Thursday (May 6), with the president of the American Paper and Pulp Association (Frank L. Moore,, of Watertown, N.Y.) in the chair. After making some minor changes in the constitution and adopting the title Technical Section of the American Paper and Pulp Association as the name of the organization, Henry E. Fletcher was elected chairman of the Executive Committee, with W. G. MacNaughton and Ernest Mahler as associates.

Thomas J. Keenan, editor of "Paper," was chosen Secretary-Treasurer and "Paper" was designated as the official journal of the Section. As a Committee on Publication Charles F. Rhodes and Henry Oberman were named.

The annual dues of members and associate members were placed at $5, each member to be entitled to receive "Paper" as part of the privileges of membership. The following is a summary of the constitution as finally adopted:—

Constitution of the Technical Section.

The Technical Section of the American Paper and Pulp Association is an organization of individuals apart from the activities of the parent association.

Article 1.—Name: This association shall be called the "Technical Section of the American Paper and Pulp Association."

Article II. —Objects: The objects of the Section shall be:—

1—To stimulate interest in the science of pulp and paper-making.

2—To provide means for the interchange of ideas among its members.

3—To encourage original investigation.

Article III.—Membership: There shall be two classes of members: (1) Members, (2) Associate Members.

1—Qualifications for Members: Any person who occupies a position with a member of the American Paper and Pulp Association, who has had a satisfactory technical education or who, though not having had a technical education, has special qualifications and experience.

2—Qualifications for Associate Members: Any person who will assist and support the aims of the Technical Section of the American Paper and Pulp Association, and who, by virtue of his qualifications, is likely to further the work of this Section.

Associate members have all the privileges of the Technical Section, except voting and holding office.

3—Applications: All applications for membership must be made to the Secretary in writing and shall embody a concise statement with dates of the candidate's technical training and experience, and shall be in a form and in such detail as may be prescribed by the Executive Committee.

4—Election of Members: Each candidate for membership shall be proposed and seconded by members of the Technical Section and shall be voted on by the Executive Committee of the Section, a majority of whose votes shall be necessary for election.

The Executive Committee shall also decide as to which class of membership the candidate is entitled.

5—Honorary Members: Honorary members may be elected at any time by unanimous vote of the Executive Committee. They shall have all the privileges of members but without payment of dues.

6—Dues: The annual dues for associate members shall be $5.00. payable at the beginning of the calendar year.

A member who has not paid at the end of the year is suspended.

It was originally proposed to hold the next regular meeting of the Section at Kalamazoo, Mich., early in June, but it was decided at the Chicago meeting to defer this until later in the year, the Secretary being instructed meanwhile to get into communication with the mills at that place in order to perfect arrangements.

There is every indication that the Technical Section of the American Paper and Pulp Association will ultimately prove a factor of great importance in the industry. It has long been felt that insufficient attention has been paid to the training of men for technical positions in pulp and paper mills, and this is a defect to be remedied. Mill chemists and engineers will be encouraged to communicate the results of their investigations where this can be done without detriment to the manufacturers concerned and it is hoped by this means to make the regular meetings especially interesting and valuable to all participants.

WHO'S WHO IN THE CANADIAN PULP AND PAPER INDUSTRY

J. E. A. DUBUC.

President of the North American Pulp and Paper Company.

By F. X. GOSSELIN.

(M. F. X. Gosselin, author of the following sketch, was born at the Island of Orleans on the 7th May, 1857. He made his classical studies at the Quebec Seminary, and his professional studies at the Laval University of Quebec. He was admitted to the Bar on July 18th, 1879, i.e., when he was only twenty-two years of age. In September, 1879, he fixed his residence in Chicoutimi, where, during two years, he practised as lawyer in partnership with the now retired Judge Ernest Cimon. He afterwards practised alone until the 3rd March, 1886, date on which he was appointed Prothonotary of the Superior Court of the District of Chicoutimi; this post he has occupied ever since. He has been directly interested in the industrial development of Chicoutimi and surroundings, and very few of the companies now existing in Chicoutimi do not have him in their ranks either as Director or Shareholder. He has always been deeply interested in the history of the region. A brief history of Chicoutimi published on the occasion of the visit there, a couple of years ago, of "La Federation des Chambres de Commerce," and entitled "Chicoutimi, la Reine du Nord," is due to his pen.

It is unfortunate that the following translation of M. Gosselin's sketch has done such scant justice to his clear and scholarly French prose style.—Ed.)

In his book on the Saguenay,* M. Buies, after having described in that picturesque style of which he was master, the entrance of the first locomotive into the town of Chicoutimi on the 2nd August, 1893, adds: "From this day the residents of Chicoutimi felt that they had among them an ignored spirit, which was waiting its opportunity, and this spirit, which was none other than the fiery demon of Progress, had taken possession of them to such an extent that they could not hold themselves back any longer, and which made them advance along lines of construction, improvements, diversified enterprises, as if they had only to touch a single ring to make all turn into reality."

The picture is, perhaps, a little brightly painted, for things did not march quite so quickly. Chicoutimi was able to wait two years longer in a delicate "statu quo." It was not until 1895 that the little town, to use the expression of the same author, "with drawn sword," prepared to leave a "narrow existence as the principal town of the district," beyond which it seemed "to have never dreamed of any other future." That year saw the construction of an iron aqueduct and the lighting of the town by electricity.

But 1897 came. It was then that the "fiery demon of Progress" took visible form in the person of a man, who was not only possessed of that hitherto ignored spirit," but possessed himself the genius of finance, which, aided by a faith which would move mountains, by a judgment capable of solving the most inextricable difficulties, and by an uprightness of character capable of inspiring the most complete confidence, will not delay in gaining him an enviable reputation in the world of finance in England and France, as well as in Canada and the United States.

It was M. Dubuc who that year became the moving spirit and took the direction of industrial enterprises at Chicoutimi, and launched his adopted town with all sails set towards the high seas. "Duc in alto," such seemed to be his motto from that time.

M. Dubuc was born at Saint Hugues, in the County of Bagot, on the 21st of January, 1871. He was the eldest son of the late M. J. A. Dubuc, merchant, of Sherbrooke, and Dame Marie Blanchard. He was only three years old when his parents moved to establish their home in Sherbrooke, and it was at the seminary of this town that his education was obtained. Before he had attained the age of sixteen years, he entered La Banque Nationale, Sherbrooke branch, where in a little time he scaled the ladder in office management. One can say in full truth that he passed through without stopping, and in 1892, hardly 21 years old, he arrived in Chicoutimi to take charge as manager of the new branch established in that town, and which he was able to make in so short a time one of the most important. In 1897, to the great astonishment of those who do not know him, he resigned this position in order to accept that of Managing Director of Chicoutimi Pulp Co., which had just been founded, and of which he was himself one of the promoters.

M. Dubuc was always gifted with a lively sagacity. It was not necessary for him to be long at Chicoutimi for him to appreciate at their true value the mighty hydraulic powers with which the Chicoutimi river is filled, and, with a spirit which was never overcome, he had soon made known all the resources which could be drawn from it.

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* "The Saguenay and the Basin of Lake St. John," by Arthur Buies, 2nd edition, 1896, Leger Brousseau, Editor, Quebec.

In 1896 he judged that the time had come to attach himself to a group of enterprising men who had taken the initiative to take Chicoutimi from its beaten path, and to set it in the march of progress.

In 1897 in collaboration with the same group, and with the valuable co-operation of certain men of affairs from abroad, he laid the foundations of this pulp company, of which it can be said that it "appeared in Israel as a sign of contradiction," and of which the success ever growing, in spite of all opposition, was due to make his reputation.

This company, founded with a capital of $50,000, developed with such rapidity that in less than fifteen years it was necessary to increase its capital successively to $500,000 and $5,000,000. It began in 1898 with six grinders producing 30 tons a day, and with 150 employees. In 1899 it added three grinders to produce 45 tons, and finally in 1913, 44 grinders were installed consuming each day 12,000 pulp sticks, which are converted into 285 tons of pulp. It employs 800 people in its works, and 1,000 men in the cut and drive.

M. Dubuc has just placed the crown on his work by the organization of a financial syndicate formed in Boston on the 5th May under the name of the North American Pulp and Paper Co. Its object has in view the exploitation and construction of pulp mills, both mechanical and chemical, in Canada, and the founding and construction of paper mills in the United States in navigation towns such as New York, Boston, Philadelphia, and Cleveland. The first companies forming part of this combination are La Compagnie de Pulpe de Chicoutimi, with groundwood mills at Chicoutimi and Ouiatchouan producing about 325 tons dry a day; The St. Lawrence Pulp and Lumber Corporation, with chemical pulp mill at Chandler Pabos, Gaspe Co., which will produce before long 125 tons a day; and the Tidewater Paper Mills at Brooklyn, N.Y., producing ninety tons of newsprint a day.

New paper mills will be constructed a little later in the United States, and new pulp mills, both chemical and mechanical, will be established a little later in Canada.

This new syndicate, which commands the attention and direction, and very considerable resources, was formed with a group of leading financiers from New York, Boston, Cleveland, Pittsburgh, and especially with the co-operation of Chandler and Co., Fuqua and Co., of Philadelphia, and M. J. E. A. Dubuc, managing director of the Chicoutimi Pulp Co., and president and Manager of the St. Lawrence Pulp and Lumber Corporation. The formation of this powerful syndicate ensures to the industries under its control all the financial backing necessary to their entire development, and will give shortly to the Saguenay and Gaspe regions new mechanical and chemical pulp mills, which will be able to produce several hundreds of tons a day.

The Chicoutimi Pulp Co., which previously absorbed the Ouiatchouan Co., acquired the control of the Chicoutimi Freehold Estates, and of the Roberval-Saguenay Railway. The whole forms one of the most extensive enterprises on the American continent.

M. Dubuc is a Roman Catholic, whose devotion to all good works, social enterprises, charitable organizations, and educational institutions supported by the Church, is well known, and it was in recognition of his services that the Holy See conferred on him in 1904 the title of Chevalier of the Order of St. Gregory the Great. He married in 1893 Mlle. Anne Marie Palardy, daughter of Doctor Palardy of St. Hugues, who has presented him with fifteen children, of whom five are still living.

Without doubt it would be an exaggeration to attribute to M. Dubuc the exclusive credit for the creation, the development, and the success of all the enterprises of which we have just given a general idea. Alone, in spite of his talents and his spirit of initiative, however resourceful he might be, it would have been impossible to conduct to a successful conclusion such colossal work. Let a man have as marvellous a brain as one can imagine, still he is only a man. It is necessary for him to have collaborators, and M. Dubuc has not been failed in this regard. He has found, notably in Quebec, several men of affairs who by their position in the social, financial and political world, by their honorable standing, and integrity above every suspicion who could, and did, bring to him the most valuable counsel.

Distinguished, clear-headed, sensible, and wise men, they have thoroughly understood their man, and have not hesitated to put their money at his disposal, along with the authority of their name, their prestige, and their distinction. The brevity of this article does not allow us to give to each of them the merit which is rightly his, but we cannot neglect to mention—and we would write it in letters of gold—the name of the Hon. M. Nemese Garneau, Member of the Legislative Council, and President for fifteen years of the Chicoutimi Pulp Co.

ABITIBI PULP AND PAPER CO. TO TURN OUT NEWSPRINT SOON.

A report from Cobalt says that it is fully expected that before the end of June the Abitibi Pulp and Paper Co. will have reached the paper producing stage in its history. The first unit in the paper mill is now being installed and rushed to completion and everything is ready for the final touches to allow the preliminary trials of the paper machinery early next month. The first uni twill give the company an approximate output of 60 tons daily and this is to be followed by the installation of three additional units later in the year. The entire paper mill will be running, it is expected, before the end of 1915, when an output of over 200 tons daily will be realized.

NEW DIRECTORY.

The "Pulp and Paper Magazine" has been favored with a copy of the "Directory of Papermakers of the United Kingdom" for 1915. This publication, which is now in its 39th year, has received the most scrupulous revision of the publishers, Marchant, Singer & Co.

The publication includes lists of papermakers under all the various headings, authentically revised, complete list of trade designations, embodying actual watermarks and trade names other than watermarks, and is completed by a statement of paper trade customs, as adopted by the leading Associations in Great Britain and Ireland.

The volume, which sells for 1s 8d in other countries than Britain is obtainable from the publishers at 47 St. Mary Axe, London, E.C.

UNITED STATES NOTES

A quarterly report of the American Paper Company, made public at Holyoke, Mass., last week, shows that the sales during the first three months of 1915 were about 20 per cent less than for the same period a year ago. In other words, the mills of this company have been producing only 60 per cent of their capacity during that time.

* * *

The Bradley Construction Company has commenced work on the two big plants for the Oswego Falls Pulp and Paper Company, at Fulton, N.Y.

* * *

Charles W. Bell, formerly vice-president and general manager of the American Strawboard Company has purchased a controlling interest in the Norwich Paper Mills Co. Inc., at Norwich, Conn. Mr. Bell assumes the office of treasurer. The Norwich mill is at present running one machine and will doubtless be running both machines in a short time, under the new management.

* * *

At the annual meeting of the Keyes Fibre Co., held at Waterville, Me., May 12, the following officers were elected: William Brooks, of Holyoke, Mass., President; E. J. Lawrence, Fairfield, Vice-president; George G. Averill, Waterville, Treasurer and General Manager. The above together with Nathan Heard, of Boston; E. H. Allyn, of Holyoke, Mass.; C. D. Prince, of Portland; Mabel K. Averill, of Waterville, constitute the board of directors.

* * *

The pulp and paper industry in Jefferson St. Lawrence and Lewis Counties, New York State, comprises thirty-four mills and employs [illegible] hands according to the thirteenth annual report of State Commissioner of Labor James M. Lynch, in the second annual industrial directory covering industrial activities for the year 1913.

* * *

The Paper Products Company is a selling concern just incorporated at Chicago, Ill., with a capital of $2,500, by Albert E. Dennis, A. Barnum and Adolph H. Hansen.

* * *

George A. Bagley, president of the Bagley & Sewell Paper Machine Manufacturing Company, of Watertown, N.Y., died at his late home during the past fortnight following a general decline in health. He was in his eighty-eighth year. For sixty-two years he had been identified with the Bagley & Sewell Company, and was recognized as one of the oldest and most prominent manufacturers in the State. In the community where he spent a large portion of his life, he was considered a man of sterling traits and great judgment on all matters affecting the interests of the people.

* * *

The New Haven Pulp & Board Company of New Haven, Conn., which purchased the property of the old Mallory Wheeler plant is having plans made for the erection of a factory building on this site. This new structure is to be used for the company's machine and shipping departments.

* * *

The plant of the Colonial Paper Company at Freeman's Point near Portsmouth, N.H., was sold at a receivership sale last week, to Carleton Bunce, representing the Equitable Trust Company of New York, for $100,000. Mr. Bunce refused to state whether or not the plant would be reopened for the manufacture of paper.

* * *

The Potsdam Paper Mills of Potsdam, N.Y., recently bid in by Hannawa interests at a referee's sale, have again changed hands. This time the property has been purchased by paper mill men from Ohio and Illinois. A new corporation will be formed and extensive alterations and enlargements made in the mills, which will soon be re-opened with a much larger force than was heretofore employed there. In the new corporation will be associated A. A. Srere, of Franklin, Ohio, and H. E. Parke, of Parke & McCauley, paper dealers of Chicago. The new corporation will specialize in the manufacture of fine book, bond, ledger and envelope papers of the higher grades. It is said that new machinery will be installed at once to the value of about twenty thousand dollars.

* * *

E. N. Hill has been appointed receiver for the United States Board and Paper Company of Carthage, Ind. The complaint alleges that the company is [illegible]. The complaint alleges that the company is in debt in the sum of $69,000. The suit was brought by the Central Savings Bank, a Michigan corporation.

* * *

Excavating has begun preparatory to the building of a new concrete steel store house for the Volney Paper Company, at Fulton, N.Y. Plans for the store house are not yet complete, but it will probably cover all the space between the Volney mill and the river bridge and, fronting on North First Street, extend back to the farther side of the hydraulic raceway.

* * *

Fire damaged the plant of the United Indurated Fibre Company at Lockport last week to the extent of between [illegible] and [illegible]. Lightning striking the plant twice during a thunderstorm caused the fires.

The International Paper Plant at Niagara, N.Y., is making ready to receive its regular spring shipments of wood pulp. The new channel being constructed in the upper river will not be in readiness for some time and the woodpulp during the early summer months, at least, will have to be received in the usual way the barges docking at Tonawanda and the pulp being brought to that city via rail.

A Katzenstein Company, Inc., dealers in paper mill supplies at 50 Church Street, New York City, has removed to more spacious offices at 132 Nassau Street.

* * *

An addition that is to cost about $900,000 is to be a built for the Oswego Falls Pulp and Paper Company at Fulton, N.Y. The contract has been awarded the Walter Bradley Company. The building will be new pulp mill and storehouse. The estimated expense also covers a new hydro-electric development to be made on the upper dam of the company and the work under the general contract will be started with in a few days.

* * *

The annual stockholders' meeting of the International Paper Company, 30 Broad Street, was held at the company's offices in Corinth, N.Y., on April 28, at which the usual election of directors and officers took place. Four of the thirteen directors, whose terms expired this year were re-elected for another three-year-term. These were Ogden L. Mills, Samuel L. Fuller, F. B. Close and A. N. Burbank. There was no change in either the board of directors or in the executive officers of the company.

New Dam in New Brunswick.

The Edward Partington Pulp and Paper Company is reported as proceeding with a dam in the upper St. John River for the purpose of making their log drives easier. The Ambursen Hydraulic Construction Company will undertake the work.

A. P. P. A. Establishes Western Office.

Announcement was made last week at the headquarters of the American Paper and Pulp Association, 18 East Forty-First Street, New York City, of the establishment of a Western branch of the wrapping paper division of the Association. Temporary offices have been opened at the Congress Hotel in Chicago, where A. J. Stewartson, former chief statistician of the Association, has been put in charge.

China Clay Co. Has New Name.

The China Clay Co. of Manchester, Eng., has announced through its Director, Mr. J. Williamson, that since April 30th the firm will be conducted as a private Limited Company under the title of: "Manchester China Clay Co., Ltd." The company states that this alteration will in no way affect the conduct or management of the business which will be exactly the same as before.

Jeffrey Co. Removes.

The Jeffrey Manufacturing Company, Columbus, Ohio, announce the removal of their New York branch from 77 Warren Street to 50 Dey Street (adjoining the Hudson Terminal). Mr. George H. Mueller, assistant sales manager of the Jeffrey Company, is the manager in charge of this office.

To Capture Markets.

The Export Association of Canada, Limited, with head office in Montreal, is being formed and application will be made for a federal charter. The authorized capital will be half a million dollars. It is the intention of the company to operate on broadly national lines and to secure for Canada a new and larger portion of the world's trade, and to develop and carry on the export business in Canadian products upon a national co-operative basis. The possibilities of such an organization are very great. Among the provisional directors are J. H. A. Acer, manager of sales for the Laurentide Co., Montreal, and C. B. Gordon, of Montreal, who is a director of the Provincial Paper Mills Co., as well as many other leading business men in various lines of industry. The provisional directors have secured the services of F. C. Armstrong, of London, Eng., and R. J. Younge, of Montreal, to organize the Association, and afterwards for the first year of operations to act as joint general managers. In its relations abroad, the Association will aim in the first place at utilizing and strengthening the position of already existing organizations which have developed trade within the Empire and notably with New Zealand, Australia and South Africa.

German Papermaker Interned.

Dr. Lachmann, who for some time occupied an important position in the Lincoln Paper Mills Co., Merritton, installing the necessary equipment and supervising the production of the new lines turned out by them in greaseproof and glassien papers, was realeased recently, being a citizen of Germany and a lieutenant in the army. He is now interned at the detention camp at Niagara Falls. James Clark is now supervising the plant of the Lybster mill, under the direction of Robert Daw, superintendent of the company. The new lines of paper are meeting with much acceptance by the trade.

Toronto Paper Manufacturing Co. Doing Favorably.

At the annual meeting of the Toronto Paper Mfg. Co., Limited, held on May 14, R. S. Waldie was re-elected president, W. J. Sheppard vice-president, and A. W. Briggs secretary. The other directors are: Rev. Dr. William Briggs, T. Albert Brown, R. A. Lyon and T. H. Watson. The report to the directors stated that the past year was begun with a credit balance in profit and loss account of $27,534.35. To this there was added the earnings for the year amounting to $58,761.54, making a total of $86,295.79. From this there was deducted bond interest amounting to $30,000 and dividend No. 7, which was paid on April 15, 1914, amounting to $11,250. There was also written off the balance of organization expenses $4,441.59, and written into depreciation reserve $5,857.00. This left a balance to carry forward at credit of profit and loss amounting to $34,777.20. During the year there was expended on capital account $2,070.66 with which a building was erected for taking care of the finished product. The plant had been kept up to date, and an amount set aside for depreciation sufficient to bring up the reserve to $115,000.

Brompton Co. Moves Sales Office.

The Brompton Pulp and Paper Co., East Angus, Que., announces that their Sales Office, at 299 Congress Street, Boston, Mass., has been transferred to the Head Office at East Angus, Que.

NEW PATENTS

John Herman Thickens, of Bathurst, N.B., formerly of Buffalo, N.Y., has been awarded a patent in the United States for a new process of isolating wood fibres, which is printed in "Paper."

The inventor says: It is the object of the invention to provide a process by which a fibered pulp can be produced from wood and other suitable material without the use of recovery systems of any kind, and more particularly to produce a pulp in which the fibres have not been attacked to the extent now customary and therefore are stronger than usual, and produce a greater yield per cord of wood.

It is the further object of this process to cut down the consumption of chemicals to a minimum, only sufficient amounts of these materials being added to neutralize other compounds formed which would retard the digesting process.

In the furtherance of these objects and others, which will hereinafter appear, the wood either in the form of chips or in much larger sizes is placed in a suitable digester and there steamed thoroughly, after which a solution of an alkaline compound is admitted to the digester at a temperature slightly sufficient to substantially flood the digester and cause condensation of the steam in the chips or blocks under treatment, with the formation of a partial vacuum in the wood whereby the alkaline solution is rapidly drawn in to fill the cells of the wood. The solution is then drawn off quickly and the steaming of the chips is continued as before, until the condition of the wood calls for the application of additional alkali, and then the flooding and resultant condensation are repeated. The cycle of steaming and flooding can be continued as many times as desired until the wood under treatment meets the particular requirements of the case. The material, after this treatment, is then mechanically reduced in edge runners or beaters, or is otherwise manipulated as the particular needs of the case may be.

Considering the process more in detail, the physical and chemical phenomena involved will here be set forth with particular reference to the production of woodpulp, but I am aware that features of the process are of more general application where fibrous or woody structures are to be reduced to a pulp condition and a long and strong fibre is secured.

The wood to be used is barked and sawed just as in the ordinary soda or sulphite process, and it can be chipped according to usual methods before digesting. However, I have found that chipping is not necessary, and for certain purposes I prefer to treat the wood in the two-foot lengths prepared for grinding or smaller "hogged" waste from such as slabs and edgings. By applying the process to large pieces, an unusual fibre structure is obtainable in the final product.

The wood, whether in the form of chips or in the form of two-foot lengths, is placed in a digester either of cast iron or steel lined in a suitable manner to resist the action of the chemicals, and is there subjected to the heating and disintegrating action of steam. The pressure of the steam may vary through a wide range, as from 10 to 80 pounds per square inch, depending on the size of the wood pieces, and other special conditions of operation, and the duration of the initial steaming will likewise depend on the size of the material and the result required. With wood in small pieces an initial steaming of half an hour is satisfactory, while with large chunks it might in extreme cases be prolonged as much as thirty hours. The longer steaming treatment gives a darker color and in some instances the color requirement may determine the duration of the initial steaming. In general the wood should be steamed under pressure for such a length of time as will allow the wood to become heated throughout to the temperature of the steam, and when this point has been reached the alkaline solution can be introduced.

The alkaline solution used for neutralizing the otherwise acid condition of the material may be either a solution of calcium hydroxide, sodium hydroxide, sodium carbonate, or other suitable alkaline material, and is admitted in large quantity and quickly through the bottom of the digester until the digester is substantially filled with the alkaline solution. The temperature of this solution on its admission is slightly below the boiling point, and this sudden flooding of the digester with a relatively cold fluid causes condensation of the steam in the digester and throughout the chips or wood chunks, with the result that a partial vacuum is formed within the cells and pores of the wood, and the alkaline solution is drawn in or absorbed by the wood in large quantity, penetrating even to the center of relatively large pieces which have been heated up to the temperature of the steam. In this way a much more thorough impregnation of the wood with alkaline solution can be obtained than by mere soaking in the solution, or even by the application of external pressure, for with pressure impregnation there remains in the cellular structure of the wood very little fluid after the external pressure is removed.

As soon as complete condensation of the steam in the wood is effected—and in determining this, account must be taken of the low thermal conductivity of the wood—the alkaline solution is quickly drawn off, leaving the wood impregnated and permeated substantially throughout with the alkaline solution, but leaving the digester otherwise empty of the solution. Then steaming is continued as before, until upon taking off a sample from the digester it is found that the chips or wood react acid, and thereupon the alkaline solution is again introduced as before until it floods the digester and condenses the steam. The alkaline solution is then quickly drawn off again and the steam treatment continued until the chips again react acid. This procedure of alternately steaming and filling with removal of the excess alkaline solution each time is carried on until the result [illegible] is obtained to suit the particular requirements of the case.

When two-foot sections of wood are used, the cooking treatment is not carried to a point where the fibre is as free from lignocellulose as when the chips are used, for after the two-foot sections have been cooked or heated as above described, they may be ground in the ordinary manner to further effect separation of the woody structure. With other kinds of wood, the digesting operation is terminated at a time when the chips slightly react acid.

As the result of the use of this process, when the two-foot sections of wood are emplyed, a much stronger pulp can be obtained than is ordinarily obtained from the groundwood process. The fibres are longer and stronger and the chemical treatment, even though not carried as far toward disintegration as in the case of chipped wood, nevertheless gives advantageous characteristics to the fiber structure.

When chips are used, the further reduction of the chip is preferably carried on either in a beater having a stone roller or in a kollergang, preference being given to the stone-rolled beater.

In applying the process here disclosed, there is the decided advantage of the elimination of the recovery process, and there is an increased yield of pulp from a cord of wood, these factors being due in large part to the absence of unabsorbed alkaline solution in the digester during the steaming treatment and to the ease with which the acidity of the product can be controlled and the possibility of taking the cooked material from the digester after it has itself returned to a slightly acid condition.

Claims:

1. The method of making strong-fibered pulp, which consists in steaming the woody material in a digester until thoroughly heated, then flooding the digester with an alkaline solution cold enough to condense the steam in the woody material and effect absorption therein of the alkaline solution, withdrawing the unabsorbed alkaline solution from the digester and continuing the steaming.

2. The method of making strong-fibred pulp, which consists in steaming the woody structure in a digester until thoroughly heated, then flooding the digester with an alkaline solution of lower temperature to condense the steam in the woody structure and effect absorption of the alkaline solution, and then withdrawing the alkaline solution and continuing the steaming until the woody structure reacts acid.

3. The method of making strong-fibered pulp from wood, which consists in steaming the wood in a digester until thoroughly heated, then admitting an alkaline solution at a temperature slightly below the boiling point until the steam in the wood is condensed and absorption of the alkaline solution is thereby effected, immediately withdrawing the unabsorbed alkaline solution and continuing the steaming until a sample of wood from the digester reacts acid.

4. The method of treating wood, which consists in steaming the wood under pressure until it becomes heated throughout, then flooding the digester with an alkaline solution admitted through the bottom thereof and at a temperature slightly below boiling, whereby the steam in the wood is condensed and absorption of the alkaline solution is effected, then quickly withdrawing the unabsorbed solution and subjecting the wood to further steaming until a sample taken from the digester reacts acid, and subsequently repeating the flooding with alkaline solution and the steaming to acid condition until the desired digesting has been effected.

5. The method of making strong-fibered pulp, which consists in steaming the wood under pressure in a digester until it becomes heated throughout to the temperature of the steam. then admitting an alkaline solution in large quantity and quickly through the bottom of the digester until the latter is substantially filled, the temperature of this solution on its admission being slightly below the boiling point, whereby the steam in the digester and throughout the wood will be condensed, and the alkaline solution drawn into the wood in large quantity, then withdrawing the unabsorbed alkaline solution and continuing the steaming until the wood is returned to acid condition.

Ottawa Notes.

Ottawa, Ont., May 25.

The J. R. Booth Company, which has been rather unfortunate in the way of accidents during the past twelve months or so, through fire and flood and other causes, one of which nearly caused the death of Mr. J. R. Booth himself, had another misfortune last week. The sulphite mills and barker machine room at the plant suffered damage to the extent of several thousand dollars by a blaze which originated in the barkers, spread to some gum-laden pipes and from there to the conveyor which carried it across the street to No. 2 engine room. It was there stopped by the Ottawa fire brigade, however. The fire will not mean delay in the operation of the paper mills, as the company fortunately has enough sulphite in stock to last until repairs have been made.

Further heavy rains have continued to improve the water situation in the Ottawa Valley and paper manufacturers are hopeful that the year will prove almost a normal one, in spite of the lack of snow during the winter. The reports from Northern Ontario in the spring were very serious, it being stated that water levels were so low that millions of logs would be hung up all summer, but in this vicinity there is nothing to bear out such an assumption. About the usual quantity or if anything rather more pulpwood has been cut by the various pulp and paper firms in this district in anticipation of a continued demand for news print.

Among the commodities whose export from Canada has been prohibited by governmental decree on account of the existence of a state of war, are ash and spruce, which may be exported to British or allied ports or to the United States only when for domestic consumption. Certificates of destination are required at ports of exit for such timber.

New regulations for the removal of timber or pulpwood from Dominion parks have been made by Order-in-Council. The new regulations provide that only such wood as is provided for in the permit be taken, that no roads be made or green timber destroyed except as is absolutely necessary, trees shall not be cut higher than 18 inches from the ground, all tops, branches and other debris resulting from his operations must be gathered into burning piles by the permittee.

Among applications before the Railway Commission for judgment is one by the Montreal Board of Trade Transportation Bureau on behalf of the Gres Falls pulp and paper firm, or an order directing that mileage rates be appended to Cap Magdeleine, Que., in accordance with Canadian Pacific Railway tariffs.

The late Captain John. L. Murphy, for many years connected with the transportation end of the lumber and pulp and paper trades in the Ottawa Valley, left an estate of $329,984, his will having been filed in Ottawa for probate. It is divided between his widow and several relatives with a benefaction of $2,000 to St. Patrick's orphan asylum in this city.

MAC.

PULP AND PAPER NEWS

The building of the Thorold Pulp Co., at Thorold, Ont., to replace the old one which was destroyed by fire some months ago, is rapidly nearing completion. The structure is built of stone and steel with tile roof, and the work of installing the equipment has begun.

Harry K. Derby, Director and Secretary-Treasurer of the Crown Chemical and Color Corporation, New York, was in Toronto and other Canadian cities on business last week. A. M. Huestis, of Toronto, has been appointed Canadian representative of the company, who specialize in satin white for coating paper plants, made by the English precipitate process.

Among those who met death at the battle of Langemarck, was Lieut. G. Massey Williamson, a former member of the Grenadier Guards of Montreal, who was attached to the 14th Battalion. He was a son of William Williamson, President of Colin McArthur and Co., wall paper manufacturers, Montreal, and a brother of Mrs. Beveridge, wife of J. B. Beveridge, general manager of the Dryden Timber and Power Corporation.

H. R. MacMillan, who has been investigating timber trade possibilities in England on behalf of the Board of Trade of Ottawa, reports that the Admiralty has bought three cargoes of British Columbia timber at a cost of eighty thousand dollars. Former purchases of the kind were usually made from the United States.

J. J O'Connor, formerly superintendent of the Don Valley Paper Mills, Toronto, has taken an important position with the Howard Smith Mills Co. at Beauharnois, Que.

The Ratcliff Paper Co., Limited, Toronto, who have for several years been doing business at 30 West Market Street, are removing to new and larger quarters at 44-46 York Street, where they will have five floors, and about 25,000 square feet of space. The new quarters of the firm are centrally and conveniently located. For some time the firm have felt the need of extra accommodation, as their present premises have been much too small and stock has been carried in rented buildings on Front, Colborne and other streets. In their new home the Ratcliff Paper Co., who expect to complete moving operations within the next few days, will carry several additional lines.

Arthur Poole, for many years proprietor of the National Last Block Co., Toronto, died last week aged fifty-seven years. He was born in Devonshire, England, and came to Canada when twenty years of age. He leaves a wife and two daughters.

The body of George E. Copping, of Toronto, President of the Barber Paper and Coating Mills, Limited, Georgetown, Ont., who was a victim of the Lusitania disaster, has been recovered and reached Toronto this week, the funeral taking place from his late residence, 72 South Drive. The body of Mrs. Copping, who was also drowned, has not yet been recovered.

The Toronto Paper Mfg. Co., who have been awarded the contract for supplying parliamentary book paper to the Federal Government for the coming year have started upon their contract. The figure, as already announced in these columns, is about three and three quarter cents. In 1913-14 the government used 1,617,365 pounds of paper and in the preceding year 1,141,737. About half of the products is in rolls and the remainder in sheets.

W. M. O'Beirne of Stratford, president of the Canadian Press Association, has been forced, owing to ill-health to relinquish his duties and during the remainder of his term of office the work will be looked after by Hal B. Donley of Simcoe, Past President of the Association. J. M. Imrie, manager of the Association, who has also been in precarious health for some weeks, has been granted a leave of absence for several months and, in the meantime, a substitute will be secured to attend to his office. It has been decided to hold the annual meeting of the Association in Toronto in September during Press Day at the Canadian National Exhibition.

The Scott Paper Co., of Philadelphia, Pa., manufacturers of toilet and tissue papers, have leased warehouse accommodation on George Street, Toronto, where stock will be carried. E. C. Martin of Buffalo, who is well known to the trade in Canada, will look after the sales end for the company.

W. H. Kraft, representing Alex. Cowan and Co., Edinburgh, Scotland, visited Montreal, Toronto and other cities this week on his way to the West on business.

The Howard Smith Paper Mills, Ltd., announce that in response to a growing demand for a high-grade tub-sized and loft-dried bond paper, they will place on the market a new line of bond paper known as: "Old Dominion Bond." The company expects that this paper will enable dealers to fill requirements which have heretofore been difficult to satisfy with Canadian-made paper.

The Canadian Red Cross Society estimates that if each head of a family throughout the Dominion contributed but 5c a month during the duration of the war, sufficient money for all purposes of the work of the Patriotic League, and the Red Cross Society would be obtained, and makes a special appeal to all who are able to do so, to send contributions to the Head Office at 77 King Street East, Toronto.

Edward J. Trimbey who, for considerably over a year, has been engaged in professional work eliminating losses in paper mills, is leaving the Canada Paper Co., Windsor Mills, Que., where he has been stationed recently, to resume his connection with the International Paper Co., Glen Falls, New York. Mr. Trimbey will be in the manufacturing department, and will devote all his time to stock saving.

The annual meeting of the Canadian Manufacturers' Association, of which many pulp and paper concerns are members, will be held at the King Edward Hotel, Toronto, on June 8, 9 and 10. Among the important matters to be taken up is the Made-in-Canada campaign when operations up to the present will be reviewed and plans outlined for the future, as well as the proposal to bring about a federation of Safety Associations under the Workmen's Compensation Act of Ontario.

CANADIAN MARKETS

The market in news print has improved considerably of late and inquiries for many sources are being received. Some Canadian plants have been forced to turn down export business. Prices remain very good and the outlook for the summer is regarded as promising. Water conditions have been vastly improved by recent rains and the level of numerous streams, which was very low, is now higher. Book and writing plants are fairly well employed and, while orders are not heavy, there are more of them than there has been for some time past. One matter of importance to the trade is the scarcity of aniline dyes, and plants have been scouring the country for supplies. While some dyes have been bought from American firms they do not possess in many instances, the strength of German dyes and manufacturers do not care to quote prices on lines where deep colors are required, but prefer to furnish papers where only tints are called for. Prices will likely be raised on all colored stock. Coated paper plants are running fuller than they have been for some time past. Toilet and tissue mills are busy, and mills making specialties all report very good business. The demand for ground wood is fair, but mostly all business is on contract. The sulphite situation is strengthening, and owing to the scarcity of imports, it is expected that prices may reach a figure considerably higher than at present. In the meantime, buying is rather light, and what the future will bring forth is problematical. There is still considerable cutting in paper bag quotations and the demand for all kinds of wrapping papers is moderate. There is a proposal on foot to form a Canadian Paper Jobbers' Association, and a western firm has sent out notices to the trade urging the formation of such a body. The proposition has been favorably received, and the matter may take definite shape later on. Meanwhile, paper and pulp producers are much interested in the formation of the Export Trade Association to improve Canada's strategical position abroad and to assist the Dominion in profiting by the exceptional trade opportunities now offering. The rag and paper stock market is not very active. The demand for over issues, folded news and mixed papers is quiet. The latter is moving some but prices are gradually dropping. All other lines remain about the same.

Quotations, f.o.b. Toronto, are:—

Paper.

News (rolls), $1.85 to $2.00 at mill, in carload lots.
Nows (sheets), $2.00 to $2.20 at mill, in carload lots.
Book papers (carload), No. 3, 4.00c to 4.25c.
Book papers (ton lots), 4.25c to 5.75c.
Book papers (carload), No. 2, 4.50c.
Book papers (ton lots), No. 2, 4.75c to 5.50c.
Book papers (carload) No. 1, 5.00c to 5.50c.
Book papers (ton lots), No. 1, 5.50c up.
Sulphite bonds, 6½c to 7½c.
Writings, 1½c up.
Grey Browns, $2.00 to $2.75.
Fibre, $2.75 to $3.75.
Manila, B., $2.25 to $3.25.
Manila, No. 2, $2.75 to $3.50.
Manila, No. 1, $3.00 to $3.75.
Unglazed Kraft, $3.25 to $4.50.
Glazed Kraft $4.25 to $5.50.

Pulp.

Ground wood pulp (at mill), $15 to $16.
Ground wood, $20 to $23, delivered.
Sulphite (unbleached), $38 to $42 del. in Canada.
Sulphite (unbleached), $38 to $44, delivered in U.S.
Sulphite (bleached), $54 to $58.

Paper Stock.

No. 1 hard shavings, $2.00.
No. 1 soft white shavings, $1.85.
No. 1 mixed shavings, 45c.
White blanks, 97½c.
Heavy ledger stock, $1.60.
Ordinary ledger stock, $1.30.
No. 2 book stock, 50c.
No. 1 book stock, 85c.
No. 1 Manila envelope cuttings, $1.25.
No. 1 print Manilas, 70c.
Folded News, 40c.
Over issues 45c.
No. 1 cleaned mixed paper, 30c.
Old white cotton, $1.90.
No. 1 white shirt cuttings, $5.00.
Black overall cuttings, $1.70.
Thirds, blues, $1.30.
Black linings, $1.75.
New light flannelettes, $4.25.
Ordinary satinets, 90c.
Flock, $1.00.
Tailor rags, 85c.
Manila rope, 2½.
No. 1 burlap bagging, $1.00.

Quotations f.o.b. Montreal are:—

Book—News—Writing and Posters.

Roll News, $40 to $43 per ton for large orders; $45, to $50 per ton for small orders.
Ream News, $45 to $47 per ton for large orders; $50 to $60 per ton for small orders.
No. 1 Book, 5¼c to 5¾c per lb.
No. 2 Book, S.C., $4.50 to $4.75 in large quantities; $4.75 to $5.50 in small quantities.
No. 3 Book, M.F., $4.00 to $4.25 in large quantities; $4.40 to $4.50 in small quantities.
Writings, 5c to 7½c.
Sulphite Bond, 6½c to 8½c.
Writing Manila, 5c.
Colored Posters, 4½c to 5¼c per lb.

Wrappings.

Grey Brown, per 100 lbs., car lots, $2.25 net; 5 tons $2.45; 2 tons, $2.55; 1 ton, $2.65; less, $2.75.
Red Brown, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, $3.15; less $3.25.
B. Manila, car lots, 2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, $3.15; less, $3.25.
No. 2 Manila, car lots, $3.10; 5 tons, $3.20; 2 tons, $3.30; 1 ton, $3.40; less, $3.50.

No. 1 Manila, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton, $3.65; less $3.75.
Kraft, $3.75 to $5.00.
Fibre, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton, $3.65; less, $3.75.
Fibre, $2.75 to $3.50.
Manila, B., $2.50 to $3.25.

On large orders to the jobbing trade some manufacturers are quoting 10 per cent off the above prices on wrapping.

Pulp.

Sulphite easy bleaching, $43 to $45 per ton.
News quality, $41 to $42 per ton.
Bleached sulphite, $54 to $59 per ton.
Kraft pulp, $3.60 to $4.00.
Ground wood, $20 to $23, delivered in United States. States.

NEW YORK MARKETS.

New York, May 25, 1915.

Belated spring rains seem to have improved the situation in the ground wood market, as far as the consumers are concerned. Heavy rains in the past few days in particular throughout the eastern pulp grinding industry have enabled the makers to keep machines going on a fairly good basis. In consequence, those mills making their own pulp have not been forced in the market, and those mills grinding pulp for sale are having their stocks replenished to take care of the increased demand which is sure to come as the summer progresses. As a matter of fact, buying during the past fortnight has been comparatively light—the only movement being confined to contract withdrawals. As for what the coming months have in store for the makers and consumers, remains to be seen. Some say that consumers have quite sufficient stock on hand to tide them over during the usual dull period; while others claim that there will be a great scarcity and that prices will be held at very high levels. A continuation of the local rains cannot but spoil poor business for the distributors.

The European war is now beginning to have its direct effect upon the chemical pulp market in this country. As a result of England placing an embargo on coal to neutral countries, unbleached sulphite has strengthened considerably. Some Scandinavian mills are beginning to consider the possibility of importing coal from the United States in order to keep her pulp mills running, and unless some unforeseen happenings tends to change the situation, it is more than likely that the Scandinavian mills will advance prices sufficiently to meet the extra cost necessitated by having to buy coal in the United States. This applies to all grades of Scandinavian sulphites and sulphates, but unbleached, which is in the greatest demand at present is probably the one grade that is most affected. Bleached sulphite and sulphate, as well as kraft pulps are in light supply only and a prospect of advancing prices does not seem to induce buying.

The local paper stock situation is just about as bad as it possibly could be. [illegible] and packers are resorting to [illegible] methods in order to move their stocks to make room for incoming collections. Hard white shavings are selling as low as $2.15. [illegible] soft white and colored shaving respectively is $1 75 and 45c. Flat stocks are [illegible]. White news ranges from [illegible] in broken lots to [illegible] for strictly new news. Common are accumulating rapidly, and though the market is reported around [illegible], it is understood on good authority that sales have been effected at a lower price. Rag stocks, both foreign and domestic, are in pretty much the same condition as waste paper stocks, buying is light and accumulations are coming in steadily, causing an easing in price in many grades. Bagging is probably the most active of the raw stocks. There is a fairly good inquiry for gunny and the several other kinds, and prices are being maintained on a pretty even basis.

Competition seems to be the principal feature in the local paper market at the present time. According to several of the mill men visiting the trade this week, quite a few of the mills throughout the east and middle west have very heavy surplus supplies on hand. One manufacturer when interviewed by your correspondent claimed that he was willing to place his goods on consignment to be paid for when sold, if he knew the party was reliable. A large local jobber also said to your correspondent that he had just received a proposition from a mill to the effect that he could have a carload of a certain grade of paper free if he would only pay the carrying charges. As a matter of fact, buying by the jobbers is not altogether bad, as it is generally thought. Quite a few of the larger concerns in this city report that the first two weeks in May were away ahead of the corresponding period a year ago as far as the volume of passing business is concerned. The great uncertainty, however, now prevailing regarding the disturbances between this country and Germany is causing everybody to buy cautiously and conservatively. Jobbers are therefore not laying in any surplus stocks, but are only buying as they actually need. Newsprint is probably laboring under the greatest competition of any grade. Manufacturers are reported to be slashing prices right and left. No authentic information can be had along this line, as everything is being done on the quiet and offers are generally made verbally. Outwardly the manufacturers appear to be in favor of getting together and maintaing prices, but inwardly they are willing to make a sale at any price in order to get the business. It is the consensus of opinion that the market will shortly rebound and be once again on a very firm basis. The tissue situation in the tissue market is not much different from that existing in news. Competition of a very keen order still prevails, notwithing the fact that the makers have been reported as agreeing to stand together from time to time. Fibre and manilas are also in a very weak condition and sales are reported at prices without regard to cost of production. Kraft papers are moving slowly, and with stocks accumulating, values are being disregarded when it comes to making sales. Book papers are moving slowly in a seasonably way, but the makers seem to be more fortunate than their brothers, as prices are being well maintained. This is also the case with paper board manufacturers. This market, which was weak and uninteresting several months ago now reflects a fairly steady undertone. Taking everything into consideration the local paper market is about as weak as it ever has been, and unless the disturbing elements shortly disappear many of those concerns depending upon the industry for a livelihood will undoubtedly have to seek other lines if they intend to continue business. Current market quotations are given herewith, but one must bear in mind that they are only "market quotations" and not actual quotations. Competition in all grades is too keen to be able to give actual quotations, but the following figures will give one an idea as to what the nominal quotations really are.—

All quotations purely nominal.

Pulps.

Ground Wood, No. 1, $18 to $19, delivered.
Ground Wood, No. 2, $14.50 to $17, delivered.
Unbleached Sulphite, dom., 2.20c to 2.75c, delivered.
Unbleached Sulphite, impt., 1.75c to 1.95c, delivered.
Bleached Sulphite, domestic, 3c to 3.40c, delivered.
Bleached Sulphite, impt., 2.60 to 2.90, ex dock, N.Y.
Easy Bleaching, impt., 2.10c to 2.17c, ex dock, N.Y.
Unbleached sulphate, impt., 1.80c to 2.05c ex dock N.Y.
Bleached sulphate, impt., 2.75c to 2.90c, ex dock, N.Y.
Kraft Pulp, 1.80c to 1.92c, ex dock, New York.

Paper.

Book papers, car lots, M.F., $3.75 to $3.90, f.o.b.
Writing paper, extra superfine, 13½c to 17c, del. east of Miss. River.
Writing paper, superfine, 11c to 13c, del. east Miss R.
Writing paper, No. 1, fine, 9c, del east Miss. River.
Writing paper, No. 2, fine, 8c del. east Miss River.
Writing paper, engine sized, 5c to 8c, east Miss. R.
Bond paper, 5c to 24c, delivered east of Miss. R.
Ledger paper,5c to 25c, delivered east of Miss. R.
Linen paper, 8c to 18c, delivered east of Miss. River.
Manila jute, 4¾c to 5c, delivered.
Manila, wood, 2.30 to 3c, delivered.
Kraft, No. 1, (dom.) $3.60 to $3.75, f.o.b. New York.
Kraft, No. 2, (dom.) $3.35 to $3.50, f.o.b. New York.
Kraft, imported, 3.95c to 4c, ex dock, New York.
Boxboards, news, $23 to $26 per ton, delivered.
Wood pulp board, $40 to $42.50 per ton, delivered.
Boxboards, straw, $21 to $24 per ton, delivered.
Boxboards, chip, $22 to $25 per ton, delivered.
Tissue, fourdrinier, 50c f.o.b. New York.
Tissue, white, cylinder, 40c to 42½c, f.o.b. New York.

TRADE INQUIRIES.

The Department of Trade and Commerce reports the following inquiries for Canadian goods:—

573. **Wood pulp.**—A firm in Marseilles is willing to purchase Canadian wood pulp as used in the manufacture of news printing paper.

574. **Paper for news paper.**—A wholesale paper merchant in France is willing to purchase the above in Canada, and is asking for samples and quotations for large quantities.

582. **Pulp.**—A Japanese importing and exporting firm wishes to get into communication with exporters and manufacturers of pulp in Canada.

597. **Newspaper.**—A London firm requests immediate quotations for 15,000 to 20,000 tons of newspaper for delivery in France within three or four months.

613. **Paper.**—A firm in Algiers is prepared to import paper and stationery goods on commission.

625. **Wrapping paper.**—A Paris firm invites correspondence from manufacturers of above.

642. **Paper.**—A Liverpool firm of brokers asks for names of Canadian manufacturers of parchment paper and grease-proof paper.

676. **Paper.**—A Glasgow firm, extensive publishers and wholesale manufacturing stationers, is anxious to get supplies of all sorts for this trade from Canada. Correspondence solicited at once.

677. **Paper.**—A Glasgow firm of paper merchants inquires for imitation paper in the following sizes:—20 x 30, 16 pounds, 480 sheets; 20 x 30, 19 pounds, 480 sheets.

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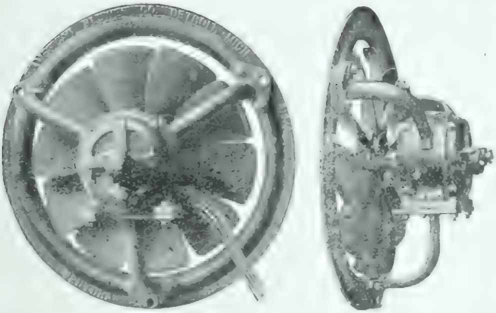

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A Neglected Opportunity

The directors of the Ontario Pulp and Paper Makers' Safety Association had very little to encourage them in their good work when they convened in Toronto on May 27th last, to place before the papermakers of the Province the constitution which they had adopted. The meeting, it will be remembered, was one adjourned from the 11th May in Ottawa. At that time one papermaker, who saw the light, turned up, and he was one of those living at a great distance from Ottawa.

In Toronto, the response to the invitation of the Directors was very little more. This occurred even in view of the fact that two or three communications on the subject had gone to every papermaker in the province.

Ontario papermakers apparently are not alive to their opportunities. The meetings were held for the purpose of deciding what should be done to unite the interests of the manufacturers in such a way as to cut down the losses from accidents in mills, and if possible to reduce the assessments which the Workmen's Compensation Board makes upon all Ontario pulp and paper manufacturers.

The position is simply this: The Workmen's Compensation Board under the Act, has fully authority in deciding what claims for injuries shall be paid by the manufacturers, and what losses shall be borne by the workmen involved in accidents. For the purpose of paying the compensation, be it by a [illegible] indemnity, or by annuities, the Compensation Board is assessing every pulp and paper manufacturer annually at the rate of 1.4 per cent of the total of his pay roll. This figure has been arrived at by a consultation of the losses in pulp and paper mills in other countries. Hardly anyone will admit that the assessment is in proportion with the necessities of the case. If, as is quite possible, the pay rolls in Ontario mills amount to $3,000,000 a year, then the annual assessment will be upward of $42,000 a year. In other words, the Province of Ontario is saying to the manufacturers today, "you are inefficient, and careless of the interests of your employees to such an extent that they are put to personal losses, which we estimate at $42,000." The smallest mill in the province will probably have to pay about $300 a year for accidents, which it may, or may not, have permitted. Some of the larger mills will have to pay over $10,000 each.

If the Ontario papermaker wants to save money, he will take up the opportunity which the Government has given him of demonstrating that his losses are not what they are estimated to be. The best and surest way of doing this is to co-operate with the other manufacturers. We urge every manufacturer to come forward and do his utmost.

Export Trade in Forest Products

As our readers are probably aware, the Dominion Government, on the suggestion of the Hon. W. R. Ross, Minister of Lands of the Province of British Columbia, has appointed Mr. H. R. MacMillan, Chief Forester of the Pacific Province, a Special Commissioner to investigate the possibilities of foreign markets for Canadian lumber. The importance of this commission is apparent to all, but it is not likely that Canadians realise in what strong hands their interests in the rest of the world have been placed. Mr. MacMillan, according to the newspapers, has already secured an order for three cargoes of lumber, which under ordinary circumstances would have gone to some other nation than Canada. This aggressive spirit, which has resulted in definite sales of Canada's forest products is but an indication of what may follow if the country as a whole would grasp even one small part of the views which Mr. MacMillan holds.

In a recent article to the "Canada Lumberman, Mr. MacMillan says:

"Canada is naturally a forest country, a condition which Canadians are prone to overlook. Of the whole of Canada, 25.9 per cent is agricultural; the remainder of the country will produce no crop but a crop of timber." The forest is, therefore, our greatest resource. It is resource so wide in area it should also if well managed, assist Canadians in maintaing a world-wide export trade in timber products.

Mr. MacMillan points out that for three hundred years Canadians have paid their foreign debts with the produce of the forest. In the earlier days we exported pine, and now we are shifting to spruce, Douglas fir, pulp and paper, and manufactured wooden articles. Comparing Canada with the United States, Mr. MacMillan shows that the exports of forest products of the Dominion are $5.97 per capita per annum, whereas in the United States the total is only $1.37 per capita per annum. Pulp and paper, and pulp products figure prominently in the commodities which Mr. MacMillan believes should occupy a prominent position in Canada's exports as time goes on. "Canada," he says, "should always be in a position to compete favorably with manufactured forest products, where she can compete with manufactured articles." It is only a pity that Canadians as a whole have not been seized with the importance of the development of our forest resources. "Canada," says Mr. MacMillan, "cannot be a great trading or commercial country unless the three-fourths of her area which is timbered is productive, supporting timber industries. Already in Eastern Canada, no permanent extension of the export timber trade is possible for the reason that the forest has not been protected from fire and reckless exploitation." Again and again it must be urged upon Canadians that the forest resources will be proved in years to come one of the very greatest assets which the country can boast. While it is true that our wheat exports will be great, still, with the vast areas of land which are capable of producing only forest crops, opportunities lie open for the development of industries, such as the pulp industry, which we will be foolhardy if we do not embrace. The members of the pulp and paper industry may felicitate themselves that it is in their own power to make one of the greatest and most intensive uses of our forests. The pulp industry is one which will be permanent, but it is necessary first of all to safeguard the timber which is now standing.

The "Made-in-Canada" Campaign

The efforts of the Canadian Manufacturers' Association and other organizations throughout the country to promote the sale of "Made-in-Canada" goods, has received wonderful support in the past few months. There are some firms who have gone the length of paying a great deal more for commodities of which they had need, in order that Canadian producers might be given preference. Fortunately, the Manufacturers' Association has had the good sense not to push the campaign to its fullest extent. The recent writer in the "University Magazine" who claims that "when a manufacturer in an industry already protected to the extent of 20 per cent, 30 per cent, or 40 per cent raises a clamour for the exclusion of foreign goods, the thing passes from protection to plunder," will not find the argument of the editor of "Industrial Canada" extreme when he defines the "Made-in-Canada" movement as follows:

> The "Made-in-Canada" argument is simply this. Canada is a young country, which, although it has one of the most moderate protective tariffs in the world, has built up a great national industrial system. For a couple of years the output of this plant has decreased because the demand for manufactured goods has fallen off, with the result that many workers are out of employment and a great quantity of unsold goods is stored in warehouses. Yet we are buying hundreds of millions of dollars worth of manufactured goods abroad. Those who advocate the "Made-in-Canada" policy say to Canadian buyers: "Before you purchase an imported article see if you can find a similar Canadian article which would suit you. You will probably find it and you will find probably, too, that the quality and price compare favorably with the quality and price of the imported article. If you should discover in some cases the Canadian article is not quite so good or quite so cheap as the imported article, ask yourself if your patronage will help in time to bring about a state of affairs where the Canadian article would be equal or superior to the imported article. Possibly, in view of the present extraordinary situation, you might concede a little in favor of the Canadian article, but we do not ask you to make any considerable sacrifice to do so. If thousands of Canadian buyers follow this policy, Canadian goods can be produced in great quantities that their quality can be improved and their price lowered. Canadian raw material will be utilized, employment will be furnished at home, and our foreign obligations will be reduced.

With the above before Canadians, they should not go to extremes of thought which might bring us back to ideas of pure Mercantilism.

SULPHATE AND SULPHITE LIQUOR UTILIZATION

The closing address at the general meeting of the German Association of Cellulose and Paper Chemists, held in Berlin recently, was a paper by Dr. E. L. Rinman, entitled, Work in the Field of Sulphate and Sulphite Waste Liquor Utilization, which was published in the "Papier Zeitung" of April 4, 1915, and reproduced in "Paper" of May 12th. Dr. Rinman prefaced his paper with a few remarks on the subject of his work, in the course of which he stated that since 1908 he had been occupied in researches in connection with the possibility of recovering alkali from the waste liquors of soda or sulphate cellulose manufacture and at the same time obtaining valuable substances from the organic constituents of the liquors. The results of these researches, published in part in "Svensk Kemisk Tidskrift," in the year 1911, he described as two processes, both of which have been conducted on a large scale. He also referred to his success last year in working out a process for the utilization of sulphite liquor, which has been for several months under test, on an industrial scale, at the expense of the Aktiengesellschaft Cellulosa. The reading of the paper then proceeded, as follows:

Utilization of Sulphate Liquor.

One of my processes for the utilization of sulphate liquor, which was the first perfected, is so intricate that it does not appear to be suited for mill operation. It comprises the following operative processes: Precipitation of the humus substances by carbonic acid, recovery of the soda by ammonia and carbonic acid, distillation of acetic and formic acids, as well as of ammonia salts, recovery of the ammonia by calcium hydroxide, dry distillation of the calcium salts of nonvolatile organic acids with calcium hydroxide. Thereby there is obtained, in addition to the complete recovery of the alkali of the liquor by replacing the alkali lost by common salt, for one ton of cellulose, the following products: Humus substance, with 6,800 calories per kilo, 600 kilos (1,320 lb.); calcium acetate and formate, 180 kilos (396 lb.); acetone spirit, 35 kilos (77 lb.); light oils, 35 kilos (77 lb.); heavy oils, 20 kilos (44 lb.).

The other process for the utilization of sulphate cellulose liquor is based on the fact established by me that the dry distillation of soda or sulphate cellulose liquor with the addition of strong alkalies—such as sodium and calcium hydroxides—conducted under joint action of an adequate volume of steam, resulted in the production of large quantities of valuable distillation products, such as acetone, methyl alcohol, ethyl alcohol, and oils consisting of higher alcohols, ketones, aldehydes and carbohydrates. That the difference between dry distillation of sulphate cellulose liquor without alkali and with alkali is highly important is revealed by the fact that by the dry distillation with joint action of steam, from liquor that contains no free alkali, but three to five grammes of acetone spirit are obtained to a kilo of wood, whereas the same liquor, combined with the proper quantity of alkali, yields under the same circumstances, by dry distillation, fifty-five to sixty grammes of acetone spirit to one kilo of wood.

In determining what alkali should be employed in the above-indicated dry distillation and the quantity that should be used, the following facts are of importance. The liquor contains, broadly stated, two kinds of organic substances; one contains methoxyl and has its origin, therefore, in the lignin constituents of the wood; the other, on the contrary, is free from methoxyl $[O(CH_3)]$ and has it origin in the carbohydrates—the saccharine, starch and cellulose of the wood. The substances containing methoxyl yield the largest quantity of acetone spirit, especially methyl alcohol, if they are distilled with soda lye and not with calcium hydroxide. The best results have been obtained by working with a sodium hydroxide proportion of 60 per cent of the organic substance. The substances free from methoxyl, on the other hand, yield the largest quantity of acetone, principally acetone with smaller proportions of ethyl alcohol, when they are subjected to dry distillation with calcium hydroxide and not with sodium hydroxide. The best yield is obtained by adding one and a half times as much calcium hydroxide as would be required to render the solution caustic. Consequently a liquor rich in substances containing methoxyl should be dry distilled with a mixture of sodium and calcium hydroxides. The best yield of valuable by-products is obtained, for instance, from the liquor resulting from the production of easy bleaching woodpulp, by subjecting the liquor pitch to dry distillation with one molecule of sodium hydroxide and three-fourths molecule of calcium hydroxide to one molecule of sodium oxide found in the liquor.

This process for the utilization of sulphate liquor is comparatively simple, as will be evident from the following brief description of it.

As digester liquor in cellulose digestion, there is employed soda lye, with 3 per cent of sulphate of soda (calculated according to active alkali), experience proving that this produces just as good cellulose as the customary sulphate lye containing 30 per cent of sulphate of soda.

To the resultant liquor an equivalent quantity of soda, in the form of recovered soda, is added and it is causticized with lime, also recovered in the process. The carboniferous lime sludge is filtered and the filtrate concentrated to 35 deg to 40 deg. Beaume.

This thick liquor, mixed with three-fourths of a molecule of calcium hydroxide, calculated according to the quantity of soda in the original liquor, is then transferred to an evaporating apparatus, such as is used in sulphite cellulose mills for the production of "cellpech" (cellulose pitch), and therein further concentrated until, while hot, it is viscidly fluid.

This mass is subjected to dry distillation, whereby, for one ton of cellulose, the following products are obtained: Approximately 300 cubic meters of noncondensable gases of high fuel value; 125 kilos of acetone spirit, light and heavy oils; a retort residue of sodas and calcium carbonate of about 400 kilos, containing carbon.

The combustible gases supply so much of the fuel required to effect the dry distillation that only about 100 kilos of coal are needed per ton of cellulose.

This process has thus far not matured sufficiently to be used in practice, the accomplishment of the dry distillation presenting great difficulties, while disagreeable odors could not be avoided if the liquor was sulphurous. Where the liquors contained too small a quantity of sulphate of soda, cellulose of least satisfactory quality was to be expected. However, in the meantime, I believe I have solved the problem both in regard to dry distillation and in relation to the bad odors. The dry distillation can be accomplished in ordinary wood-carbonizing furnaces in which the heating, for instance, is effected by heat elements and the mass to be distilled off, in strata or layers of a depth of about 3 cm., is transported on trucks into the retort. The manner in which the bad odor is obviated I will not state here, but this much may be said, the process completely disposes of this problem in an inexpensive manner.

If the process designed by me for the deodorization of waste gases of distillation is applied to the vaporous of the digester the bad odors ordinarily proceeding from it will not be noticed. As in working according to this method only small quantities—about 3 per cent—of sulphate of soda are used, there arise no disagreeable odors, not even from the remaining branches of manufacture, and no bad smells are diffused in the vicinity of the mill.

Utilization of Sulphite Liquor.

I now approach the discussion of my new process for the utilization of sulphite cellulose liquors. This is associated with my process for the utilization of sulphate cellulose liquor. The association occurs in the fact, discovered by me, that the organic substances of sulphite liquor, by certain treatment, can be transformed into the same organic substances that are formed when wood is cooked with soda lye, for which reason the organic substances from sulphite liquor can be utilized by the same plan of treatment as I employed for soda or sulphate liquor.

The process is conducted as follows: The sulphite liquor is mixed with so much slaked or unslaked lime as will make to one liter of liquor 22 to 25 grammes CaO. Then the liquor is boiled, first at a low temperature, then at 180 deg. Çent., altogether for five hours. After this boiling, the precipitate produced in the liquor, consisting of humus substance and calcium sulphite, is removed from the solution by filtration. The residue is treated with sulphur dioxide solution, by which the calcium sulphite is transformed into calcium bisulphite, whereas the humus substance remains. The calcium bisulphite solution is employed in making up fresh quantities of digester lye. The humus substance residue can best be freed from the water it contains by heating with hot water, it then forms a cake, containing 40 to 45 per cent of water. The alkaline filtrate, obtained after separation of the humus substance and the calcium sulphite, and which contains the remaining organic substances of the sulphite liquor, chiefly in the form oxy-acids, is evaporated to 40 deg. Beaume, and calcium oxide or hydroxide is then added in such quantity that to one molecule of CaO combined in the liquor there will be an addition of one and a half molecules of CaO.

This lime-impregnated liquor is evaporated to dryness and the dessicated mass subjected, in the presence of steam, to dry distillation. There is obtained thereby a distillate that contains acetone spirit, light and heavy oils and combustible gas. There also remains a dry distillation residue of calcium carbonate and carbon. In this manner, at the Skutskars Cellulosafabrik, from one liter of sulphite liquor which at ordinary temperature varied around 70 deg. Beaume, and which contained 0.9 per cent total sulphur, the following products were obtained: Soluble calcium sulphite ($CaSO_3$), equivalent to 13.5 Gm. SO_2 for sulphite digester liquor, 25 Gm.; humus substance (anhydrous), 50 Gm.; lime salts, 66 Gm.

From the lime salts by dry distillation was obtained: Acetone spirit, containing 65 per cent of acetone, 33 Gm.; low boiling oils, 3.3 Gm.; high boiling oils, 2 Gm.; dry distillation residue, containing 6 Gm. carbon, 46.2 Gm.; variable quantities of combustible gases.

From five cubic meters of sulphite liquor there was consequently obtained: Calcium sulphite, 125 kilos (275 lb.); humus substance, 250 kilos (550 lb.); lime salts (limed), 330 kilos (726 lb.), which yielded: acetone spirit, 16.5 kilos; low boiling oils, 15 kilos; high boiling oils, 10 kilos; lime carbon, 231 kilos, with 30 kilos of combustible carbonaceous gases.

In utilizing sulphite liquor, we can proceed by first fermenting it and distilling the resultant sulphite alcohol, then my process, as above described, may be employed with the mash obtained. The process in such case is conducted in the same manner as in utilizing the sulphite liquor without extracting the alcohol, excepting that from the mash a smaller quantity of lime salts is obtained for dry distillation. From mash at the Skutskars Sulphite Alcohol Works there was obtained, for instance, from five cubic meters of sulphite, only 225 kilos of lime salts for dry distillation.

The process described can be conducted in a different manner, according to whether the sulphite mill has wood chips, sawdust, peat, etc., at its disposition. If thin chips or sawdust are available, these can be added, with great advantage, to the sulphite liquor, when boiling it with lime; the addition of lime must, however, in such case be suitably increased, because in cooking with lime at such a high temperature as in this case employed we can obtain from sawdust on average 16 per cent of its dry weight in the form of such lime salts as yield, on dry distillation with lime, acetone and alcohol. To one cubic meter of sawdust, having a dry weight of 145 kilos, we can therefore allow an addition of six to seven kilos of CaO. The addition of one cubic meter of sawdust to one cubic meter of sulphite liquor, on cooking it with lime, increases the lime salts, in round figures, by forty kilos. The addition of sawdust is moreover advantageous in other respects. The particles during lime boiling become so saturated with deposits of humus and calcium sulphide that filtration is greatly facilitated. The precipitate can then be filtered and washed in ordinary diffusers in the same manner as the cooked cellulose. When the precipitate, consisting of sawdust, monosulphite and humus, has been freed from calcium sulphite, it can be briquetted and coked and we then obtain a somewhat sulphurous coke which in fuel value is about comparable with wood charcoal.

In cooking sulphite liquor with lime and sawdust, we must, as indicated, so gauge the quantity of liquor that to one cubic meter a cubic meter of sawdust is allowed. If the sulphite mill has not such large quantities of sawdust at its disposal, the sulphite liquor, before the calcium hydroxide cooking, must be so concentrated that the cubic volume of sawdust equals the cubic volume of liquor. The sulphite liquor must not be concentrated to more than 35 per cent of its cubic volume prior to the lime cooking, whether sawdust is available or not.

As I have already stated, where wood waste is available, the precipitate, consisting of wood substance, humus and calcium sulphite, can easily be filtered and washed in ordinary diffusers. The dissolving of the calcium sulphite out of this precipitate, with the aid of sulphuric acid, as well as the washing out of the resultant acid calcium sulphite, can be effected in the same diffusers, but they must of course be made acid-proof, lined with lead for instance. If on the other hand there is no sawdust available, the sulphite liquor is first concentrated to 35 per cent of its volume and then subjected to lime cooking. The deposit of humus and calcium sulphite thereby obtained cannot very well be filtered in the diffusers, but is best washed and filtered in a centrifugal machine. If the centrifugal is acid-proof the deposit, after the alkaline liquor has been expelled from it to a desired degree, may be treated directly—without stopping the centrifugal — with sulphuric-acid water for dissolving and washing out the calcium sulphite.

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This process has recently been subjected in the Skutskars works to a large number of tests on a wholesale scale. In these, partly mash from the sulphite alcohol works and partly sawdust have been used as raw material. Up to the present time, 500 cubic meters of mash with 500 cubic meters of sawdust have been treated. The lime cooking was undertaken in the rotary digesters of the sulphate cellulose mill, which have a capacity of thirty cubic meters. For each cooking, sixteen cubic meters of mash and sixteen cubic meters of sawdust were used, to which was added 400 kilos of unslaked lime. The cooking was conducted for the first half hour at a little over 100 deg. Cent., then for one hour at 150 deg. Cent., and finally for three hours at 180 deg. Cent. After cooking was finished, the pressure was let down and then the contents of the digesters were blown into the diffusers. From the gases blown off there were obtained for the cooking of 10.5 kilos of wood alcohol and the usual quantity of oil of turpentine.

Washing in the diffusers proceeded smoothly and the liquor passing from them was perfectly clear. The washing was stopped as soon as the density of the liquor began to decrease. This is of importance because by this means loss of calcium sulphite by solution is prevented. The organic salts that are not washed out are returned for cooking after the calcium sulphite has been dissolved away; they combine with the sulphite liquor and are by this means recovered for subsequent dry distillation. As the diffusers were not lined with lead in the experiments conducted on a large scale, the material in them could not be washed with sulphuric-acid water, and this work was consequently performed in a smaller diffuser installed for the purpose. Washing with sulphuric-acid water proceeded most satisfactorily when the mass, before washing, was steeped for an hour in the acidified water. The liquor from the diffusers was concentrated in a vacuum apparatus to 25 deg. Beaume, then treated in mixers of six cubic meters capacity, at about 90 deg. Cent., with slaked lime. The liquor thus limed was evaporated to dryness in a drying cylinder of 1.8 meters diameter. This drying cylinder turned out in twenty-four hours 550 to 590 kilos of lime salts containing 6 per cent of water.

The lime salts were then dry distilled in a furnace formed of two superimposed, [illegible] connected chambers, into which every minute 2.3 kilos of mass were loaded. The dry distillation yielded a well carbonized, small-grained, dry distillation residue of porous carbonaceous lime. The distillate still contained some mercaptan, an objectionable feature which could be avoided in the manner referred to in the sulphate process. By the distillation there was obtained acetone spirit containing 67 per cent of acetone, 30 per cent of methyl alcohol and 3 per cent of ethyl alcohol. In addition, light and heavy oils were obtained. The lighter oil, as shown by test, can be successfully used as fuel for gasoline motors.

The humus-sawdust, washed with sulphurous acid, was partly freed from water under a pressure of 80 kilos to the square centimeter, whereby a pressed material, containing about 40 to 45 per cent of water, was obtained. These pressed cakes of sawdust and humus, when coked, produced coke of limited solidity, but when they contained twice as much humus as sawdust, yielded a durable coke. The durability of the coke was increased by the addition of humus substances, irrespective of whether it had been cooked with the sawdust or was added, wholly or in part, at the briquetting.

In bringing the reading of his paper to a close, Dr. Rinman said:

"Having concluded my communication, I hope I have made known to you a process which, in the future, will make a profitable utilization of cellulose liquor possible. The entire available volume of liquor cannot of course be made use of according to this process, the demand for acetone being limited.

"Judging by the experiments undertaken on a large scale and calculations of the cost, it is to be expected, however, that mills practising this method of utilization will make a profit out of the process and solve the waste liquor problem."

Accidents Cost Money.

According to a bulletin issued by the Department of Investigation & Statistics of the Ohio Industrial Commission, people living in Hamilton County have received $154,668.90 from them during the six months ending December 31st, 1914. The bulletin states a very large proportion of these accidents might have been prevented by the adoption of simple safety devices on the part of the employers, and greater care being exercised by the employees. One death was the result of infection caused by the scratch from a nail in a barrel, from which an employee was taking the contents. The Industrial Commission are now endeavoring to lessen these accidents by eliminating the causes.

Talc Displaces Starch in Paper-Making.

According to "Wochenblatt fur Papierfabrikation," the high prices of potato starch and potato flour have caused manufacturers of fine writing and printing papers in Germany to substitute high-grade talcum in part or altogether for the starch dressing used to ensure a fine, smooth, ink-fast surface. It is asserted that for newsprint paper the talc is preferable on account of the saving it effects and the better impression produced, especially in the case of paper intended for half-tone illustrations.

Chinese Want More Paper Mills.

Tenders are now being received for the erection and equipment of a large paper mill at Canton, China. It is proposed to spend [illegible] on the erection. The equipment will bring the total cost to a very much higher figure. Members of the Trade Commission of the Chinese Republic have recently been extensively entertained by prominent business men in Pittsburgh, Pa., who are interesting local manufacturers in the project.

SOME NOTES ON SIZING PAPER WITH GELATINE

By F. CYSTER.

In the investigation of the many complaints addressed by the customer to the seller with reference to the quality of paper with which he is being supplied, it is occasionally found that the papermaker is at fault. On these rare occasions the trouble may usually be traced to anxiety on his part to preserve the high standard he has previously created.

A case in point was furnished some time ago by the complaint of a customer with reference to a paper, the furnish of which was a mixture of bleached sulphite wood and rag, chiefly cottons. The complaint was to the effect that the paper did not handle so well, and that the customary firmness and "rattle" were lacking. An analysis of the paper showed that the making in question contained rather more than the usual amount of cottons, and although the sheet was "prettier" and superior in other respects to the usual thing, the customer's wishes would have been better met by closer adherence to the former and cheaper composition. Another complaint, which with some of a kindred nature suggested the following notes, was with reference to an animal-sized memorandum paper from which type-written letters were duplicated using a previously damped cloth as a vehicle for the moisture. The complaint was that after being in use a short time the cloth became clogged and partly sized in such a way as to interfere with the even distribution of moisture, and therefore also with the duplication of the type. The fault in this case was a larger amount of gelatine than in the paper which gave satisfactory results, and some of the excess was conveyed during contact to the cloth. It is not unusual also, with some high-class tub-sized papers, to find the gelatine applied in such a way as to create difficulty when writing in the ordinary way with ink, and the pen will occasionally persist in repeating in miniature the antics of inexperienced dancer on a highly polished floor.

Facts like the foregoing with regard to gelatine suggest that there are limits to the quantity essential to produce the best all-round results. The tub-sizing process is primarily intended to produce a continuous surface sizing of ink resistant gelatine, and it is easier to exceed than to regulate the amount necessary to perform this, imparting at the same time the attractive writing surface.

The amount of gelatine absorbed into the body of the paper will vary largely with different classes of paper, being controlled by considerations such as finish, closeness of texture and capillarity of the paper on the one hand, and the temperature and consistency of the size on the other.

The gain in strength which always accompanies gelatine sizing (by which is meant the passage of the web through the bath after the paper machine and subsequent slow natural drying) is the natural effect of the better cohesion of the sized fibres. The degree of added strength produced in this way, however, is of course limited by the amount of gelatine which can be applied subject to the previously mentioned considerations, and no amount of gelatine sizing can replace the peculiar qualities with regard to the strength and endurance acquired by the sheet through the judicious selection of the raw material and its subsequent skilled treatment in the beater and on the machine.

This applies also to the added resistance to deterioration by general wear and tear, closely related to tensile strength, which is characteristic of the tub-sized paper, as here again the question of "length of life' of the paper depends largely on the same conditions which govern the strength. The term "durability," however, is capable of application in another direction, i.e., that of resistance to chemical action, and it is necessary to differentiate the meaning of the term when used in this connection from that which is implied by the measure of its resistance to folding and friction. It is quite possible that two papers made in the same way as regards beating and treatment at the machine, and from the same raw material, may give the same results when tested for strength and resistance to friction directly after manufacture, and yet to behave quite differently when stored for a length of time, supposing that one of the papers contains a quantity of injurious compounds which should have been removed before manufacture.

In this connection the application of gelatine can hardly improve the durability of paper when viewed in its capacity to withstand chemical action, either inherent or communicated, since pure cellulose, as exemplified my the cotton fibre is less liable to deterioration than gelatine. It is one of the most stable organic compounds known, and is capable of resisting to a remarkable extent the action of strong chemicals. Gelatine does not deteriorate readily in the dry state, but this cannot be said of it under conditions of abnormal dampness, when it is liable to the development of fungi and consequent decomposition.

The addition of alum or sulphate of alumina is the usual practice in preparing the gelatine bath, and its thickening action on the solution is well known. Alum causes the gelatine to form on the surface of paper a difficultly soluble and water-resisting skin. It lessens the penetrative power of the size, keeping it on the surface, and gives the paper a firmer effect than if the gelatine is allowed to keep its original more fluid condition. The excessive thickening of the size with alum has, however, attendant dangers; i.e., the surface skin may be made so insoluble that a pen glides over the paper without leaving any ink impression, and also the dried paper may show innumerable glistening points, not unlike the mica particles shown in the finished sheet by using badly levigated kaolin. In the following comparison of trials made with gelatine only, and with gelatine with the addition of alum, although in the former case the total absorption was higher, the peculiar phenomena mentioned were absent, which was by no means the case in the papers treated with alum gelatine. In connection with the surface difficulty it must also be remembered that the consistency, or more correctly perhaps the fluidity of the size solution and its penetrative power, are largely questions of temperature, and paper sized in a bath in which the heat is not sufficient to preserve perfect fluidity is bound to be unsatisfactory.

As already indicated, the penetration of the sizing solution is controlled by other considerations than those of temperature and fluidity of the size, the de-

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In "The World's Paper Trade Review,"

gree of engine sizing being perhaps the most potent factor. Paper sized mechanically by passing the web through a trough of gelatine solution is subjected to the longitudinal tension necessary to steadily unwind the hot solution with which it comes into contact is immediately absorbed through the section, and the resulting softening often causes the web to become so weak as to be unable to withstand the tension. Partial sizing in the beater is resorted to, and ultimate absorption of gelatine consequently lessened. Handmade paper, or machine-made, cut into sheets and sized by hand, has only, of course, to support its own wet weight, and can therefore be wholly gelatine sized. In this way the heavy gelatine content of the hand-sized product is of great assistance in imparting the distinctive character which such papers possess.

In order to make a direct test of the absorbent qualities to gelatine solution of papers sized to different degrees with rosin, trials were made with papers sized in successive stages with a half per cent of rosin, calculated on the air dry weight of the sheet. The composition chosen was well beaten rag with no addition of any kind. Sheets were made by hand to a substance of 120 gms. per square metre, first with the waterleaf stuff, and then from the pulp sized in the stages indicated above to 2½ per cent. The regularity of the substance of the sheets was maintained by constant additions of stuff equal to the quantities removed. The air dry sheets were afterwards sized by immersion for 20 seconds in a 5 per cent solution of gelatine, to which was added 8 per cent of sulphate of alumina on the weight of gelatine, corresponding to the formula Al_23 (SO_4), $_{12}$ H_2O. The excess of gelatine was removed in each case by rubber-covered rolls under a constant pressure. The results are set out in Table I.

Table I.

Sheet.	0	1	2	3	4	5
Per cent rosin size	0	½	1	1½	2	2½
Per cent gelatine absorbed on original dry weight of sheet.	10.2	9.1	7.5	6.5	5.7	5.2

The comparative small difference made by addition of the first half per cent rosin size to that of the second is probably accounted for by the fact that its efficiency would be lessened owing the hard water present. The most marked difference is made by the addition of 1 per cent, the consecutive additions having regular but smaller effect. It will be seen that the sheets sized with 2½ per cent absorb approximately only half the quantity shown by the completely waterleaf paper.

Table II. illustrates the greater fluidity and penetrative power of gelatine prepared without alum, but using as a preservative a small amount of formaline. Duplicate tests to the above were made, the gelatine solution being of the same strength, but prepared without the addition of alumina sulphate.

Table II.

Sheet	0	1	2	3	4	5
Per cent rosin size	0	½	1	1½	2	2½
Per cent gelatine absorbed on original dry weight of sheet.	12.1	10.8	8.9	8.0	7.2	6.5

These sheets had the advantage of being completely free from the glistening minute scale mentioned earlier but lacking in the crisp firmness of the other samples. The ink resisting qualities also were not so good.

The above results are not given as constant, definite proportions of gelatine absorbed under all conditions by papers containing the quantities of rosin mentioned. The figures would be modified by many considerations. But whatever the quantities of gelatine ultimately held by the sheet, the differences between papers rosin sized as above should bear a corresponding relationship.

With regard to the finished sizing efficiency of the papers used in the experiments, this was not estimated with the exhaustiveness necessary to give the tests comparative numerical expression, but the advantage was with the sheets containing the greater amounts of gelatine, although the degrees were not so marked as the differences of gelatine content would lead one to suppose, and could not be distinguished by ordinary ink writing.

The process of tub-sizing, in common with other important operations in connection with paper manufacture, is to the casual observer a simple operation, containing little more than is obvious, the chief difficulties seeming those of manipulative skill. It will be seen, however, that the best results depend on the consideration of the subject in all its aspects, both from the point of view of the paper and the size, and in their application with a view to suiting the finished article to the particular purpose for which it is intended.

The Paper Fibre Resources of the Empire

The Hon. Sir George H. Perley, K.C.M.G., member of the Canadian Government, presided at a meeting of the Royal Society of Arts in London, recently, when Mr. Charles Phillips, M.S.C.I., read a paper on "The Empire's Resources in Papermaking Materials."

In the course of his paper, Mr. Phillips reviewed the various fibres suitable for paper-making purposes, found within the Empire, and spoke with particular favor of bamboo. As reported by "The World's Paper Trade Review," he said, "So successfully has bamboo passed the experimental stages, that it may already be said to have come within the realm of paper-making materials, and it is not at all improbable that in the near future it will have taken its place as one of the principal fibres from which paper can be produced, especially in the Far East." In concluding his paper, Mr. Phillips said it became a matter of supreme importance at the present time that we should endeavor to supplement what might be described as our foreign sources of supply with those which were awaiting exploitation and development within our own world-wide Empire. Our present dependence upon the Scandinavian countries for supplies of chemical and mechanical pulp had not been without a certain amount of risk to the interests of the British papermaking industries, and it was conceivable that had Norway and Sweden ranged themselves in the ranks of our foes, or have been effectively prevented from conducting their export trade, a serious position would have arisen. With a ready market for its pulp exports at its own door, and with contracts to fulfil, Canada could scarcely be expected to meet anything like the requirements of this country. Where, then, should we have looked?

The Chairman, opening a discussion on the paper, said he felt a very great personal interest in the subject because his business—before he undertook that of serving the public—was in the timber and lumber trade. In his younger days they handled nothing but white pine for the pulping business; and afterwards some red pine. Of late years, however, owing to the increase in the pulp making industry, spruce had come very much to the front, and was used very extensively in Canada. White spruce was the best wood for pulp making, but they used balsam with it—they cut them together and manufactured them together, and this seemed to work very well indeed. Canadian pulp-makers were endeavoring to get enough timber at their command to keep their works going indefinitely. His own experience of spruce was that it grew about 3 per cent in a year—that was to say that in 33 years it would reproduce itself; so that the theory they had was that a mill which had enough standing timber to last it about 33 years could practically go on indefinitely if they could keep the forest fires under. The science of forestry had not made great progress in the Empire except of late years, when a good deal of attention had been given to it. Some of the pulp companies employed trained men for the purpose of estimating their timber and finding out the best way of preserving it. Fire had been a very serious danger in Canada, and there was no question in his mind that more timber had been burned than had ever been cut down. Of late years the companies had developed a system of fire-ranging, employing men to watch for fires and put them out. This practice had been fruitful of good results; and he was sure Canadians intended to give increasing attention to this important point in order to conserve their immense supplies.

Sir Daniel Morris, K.C.M.G., said the possibilities of bamboo pulp had occupied a good deal of attention. His own experience in regard to bamboo was that unless you had an enormous area of it—hundreds of square miles of bamboo—it was not a source of paper supply that could be depended on for any length of time. In the West Indies, where they tried cutting down bamboo for pulping, it was found that the clumps of bamboo would not bear cutting more than once or twice; the stool then lost its energy to reproduce, and they were unable to carry on pulping for any length of time. He should say it was very doubtful indeed whether bamboo, except in Burma, where there were enormous areas of it, was likely to be valuable for supplies of pulp. With regard to Hedychium, a potential papermaking material chiefly found in Brazil, he thought so highly of this that he recommended his friends in the tropics to establish areas of it. As regards sugar cane, the trouble was that there was a large amount of pitch, and the actual amount of fibre was comparatively small. A large number of Indian fibrous grasses had been referred to in the paper, and while most of these were good enough, as far as they went, they did not go far enough. He had been investigating various substances carefully for the last thirty years, and his opinion was that they must continue to look to wood pulp as their chief source of supply. With regard to sources of supply within the Empire, Canada must take first place; and if in Canada and elsewhere forest conservation was carried out on scientific lines, there would be new supplies of timber in thirty years that would enable them to continue the industry for an indefinite period. But he regretted that some of those engaged in the business were not sensible of the importance of conducting the industry in such a way as to make it pay; they were not looking ahead and preserving the young growth. In conclusion, Sir Daniel Morris said that Newfoundland offered a splendid field for the development of the pulp industry. The trees were not very large, but they grew thickly together, and he supposed there was no other part of the world where pulp wood could be obtained within such easy reach of the facilities for dealing with it.

Mr. A. W. Foster, Secretary of the Papermakers' Association, said papermakers were prepared to use almost any material so long as it was cheap. It must be remembered that the bulk of paper made was not required to be suitable for permanent use. The paper used for the daily press only needed a life of a few hours. The prosperous journals would give away from 12 to 20 pages for a penny, and the papermaker had to turn out something not durable but cheap. The whole point was that the pulp should be of such a character that it could be put on the market at the lowest possible rate. This, of course, did not apply to higher class of paper, such as writing, etc., for which there was ample material. The problem of production was in regard to the very large plants turning out cheap paper, and for these they must have some material which could be manufactured at a penny a pound. This meant that they must either make use of the waste product of some other industry or find some plant or tree which, growing wild, would serve their purpose without the expense of cultivation.

Mr. Clayton Beadle said he was inclined to agree with the last speaker, that they were beginning at the wrong end of the stick in investigating a fibre to see if they could make paper of it. Practically every fibre was capable of conversion into some sort of paper, and perhaps they should first consider the abundance of supply and the question of cultivation. It appeared that the cost of cultivation would put the possibility of a cheap supply out of question.

Mr. R. W. Sindall referred to Sir Daniel Morris's remarks on bamboo, and said there was no definite information that frequent cutting did injure the stools and prevent the plant from reproducing quickly. He strongly recommended the Government of Burma to look into this matter.

Mr. F. Crosbie Roles mentioned that a shipment of 19 tons of papyrus paper stock from Lake No, on the Upper Nile, was due in London on the following day. This constituted the first shipment of this kind of material into the country.

A vote of thanks to the lecturer, proposed by Sir John McCall, Agent-General for Tasmania, concluded the meeting.

C.F.A. TERRITORY RATES SUSPENDED.

The Board of Railway Commissioners for Canada has issued an order stating:—

"In the matter of the complaint of the Laurentide Company, Limited, against the rates charged by the railway companies on paper to Central Freight Association Territory, effective May 27th, 1915:

Upon reading what is alleged in support of the complaint, it is ordered that the following tariffs, namely: C.R.C. No. E-2999, Canadian Pacific Railway Company; C.R.C. No. E-3157 Grand Trunk Railway Company; C.R.C. No. P-115 Grand Trunk Railway Company; C.R.C. No. E-641 Canadian Northern Railway Company; C.R.C. No. 1103 Ottawa & New York Railway Company, be, and they are hereby, suspended until further Order of the Board."

ALUM

Written and Illustrated By JAMES SCOTT.[*]

Although it is customary to speak of alum as if it were a single definite substance, the fact is that there are several alums. However, one kind is manufactured to so much greater an extent than others that it may be taken as being typical of them all; but it has distinct properties of its own, which will be dealt with in due course.

All the alums in existence have originated from clays and shales, or rocks, and earths of a like character. They are products of alumina, which is an oxide of the metal aluminium. Clay is a compound consisting chiefly of silica (exemplified by sand, quartz, and flint) and alumina. The latter may be regarded as the "earth" or "base" of clay. When the siliceous component has been removed from clay, there remains a bulky, crude, browny-white substance, which is alumina. When absolutely pure it is white. It is possible to procure the metal aluminium from alumina; but for commercial purposes kindred minerals are used. Alumina is essentially aluminium and oxygen intimately, or chemically, blended together. Remove the oxygen, and you obtain the meal which, if it rusted like iron (it does not do so), would then revert to alumina.

The three principal industries which use alum are those of paper-making, leather tanning, and textile dyeing.

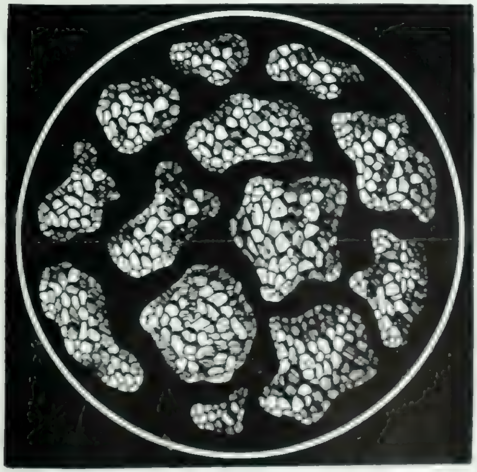

Fig. 1—A magnified pinhole view of common alum in the powdered form.

In the popular mind alum is still associated with the making and baking of bread, but the practice of adding it to flour with the motive of bleaching the latter, is now extinct.

Commercial alum is generally a double sulphate of potash and alumina. That is to say, it is made up of sulphate of potash and sulphate of alumina in combination. Sometimes ammonium is substituted for the potash; but there is so close a resemblance between the two kinds of alum that they may be regarded, on the present occasion, as identical. Both crystallise practically alike; and it is worth while mentioning that all the other alums follow the same law of formation. When soda takes the place of ammonium or potash along with sulphate of alumina the resulting alum is similar to the others just mentioned; but it is less soluble.

Ammonium alum can be readily detected from potash, and soda alums by the evolution of strong-smelling fumes of ammonia which are caused when either caustic soda or lime is added to a solution of it.

Ammonium, potash, and soda are three kinds of what are known as alkali-metal salts. Just as these can take the place of one another, so can aluminium give way to any other metal, such as iron or chromium. These are two of the commonest substitutes; but they do not concern the present reader, and are only mentioned in an explanatory manner, and to make this article as complete as necessary.

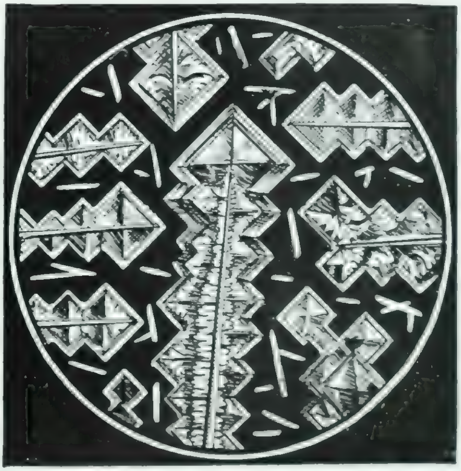

Fig. 2.—A magnified pinhole view of a solution of alum crystallized by evaporation without heat.

Ammonium, potash, and soda alums are white, while chrome alum is red, and iron alum pale violet.

Some pretty experiments can be made by suspending a cinder for a day or so in a jar containing a very strong solution of alum, prepared with boiling water and allowed to cool. Beautifully formed large octahedral crystals will occur all over it; and if these are afterwards suspended in chrome or iron alum red or violet layers will be deposited upon these. Indeed, the productions can be alternated, as one wishes, with the result that magnificently colored gem-like objects are obtainable.

Roman alum is found native at Tolfa in Italy; but it is generally contaminated by a large proportion of iron. The main mass of alum is, however, manufactured.

Sulphate of alumina (incomplete alum) can be obtained by soaking alumina in dilute sulphuric acid, and refining the product. Then potash (or probably ammonia) is added to the extract. Most of the alum now sold is prepared in this manner.

Sulphate of alumina was formerly made by roasting certain shales, feldspars or kindred minerals and then adding water thereto. The fluid extract had to be concentrated by evaporation, and it crystallised in the form of pearly plates. But when the requisite quantitiy of either potash or ammonia was added, the subsequent crystals were octahedral in shape—that is, each like two four-sided pyramids fixed with their bases in symmetrical contact with each other.

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[*] In "The Papermaker," London.

The presence of iron in alum can be discovered by adding some potassium thiocyanate to its solution, when a red color will be produced if that metal is present. If, instead, potassium ferrocyanide (generally known as yellow prussiate of potash) is used, the iron will induce the development of a blue coloration.

Iron will impart objectionable stains to paper; and its elimination is a very important matter.

Alum is added to size in order to harden it. This capacity is taken advantage of by photographers, who use alum for the purpose of stiffening the jelly-like films of their plates, etc. It also has a bleaching action, especially on any starch which may have been added to the mixture. The reader does not need reminding that size is gelatine, obtained by boiling bones, hoofs, sinews, skins and other animal refuse. Certain preservative and purifying salts are added to the substance; and these become evident when the size is spread out in a flattened state(such as it assumes if squeezed between two glass slides) and magnified. The crystals then detectable in it are regular, minute, and transparent, and of all sorts of shapes.

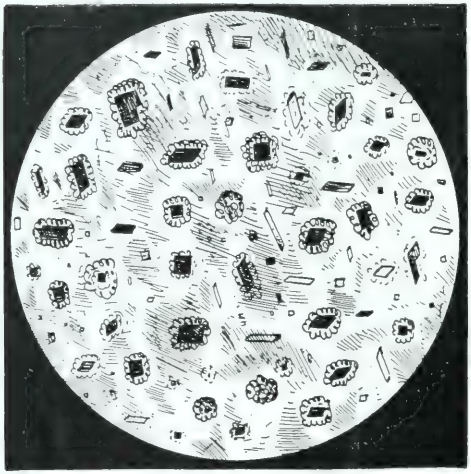

Fig 3.—A magnified pinhole view of heated alum and size. The latter is full of transparent cystals, which become brown and enveloped in frills.

Size is not regarded as in any way a crystalline substance; but I have learnt, from close observation made on a large number of samples, that a very large proportion of its bulk consists of crystals, which, however, never manifest themselves to the naked eye. It would be difficult to say precisely what influence these objects exert on the alum; but in Fig. 3 I depict the result of adding a small quantity of alum solution to melted size, and then warming the mixture. The hitherto transparent crystals darkened, and became surrounded with a frilling of bubbles, which increased in numbers and united to form a mesh.

Upon heating alum it spits, splutters, and melts, forming a porous substance distinguished as burnt alum.

When examining the granules of ordinary alum I found that they were reticulated, the meshes into which they were divided being vesicular, semi-crystalline, and glistening. Reference to Fig. 1 will enlighten the reader on this point.

When alum is dissolved, in either cold or hot water, it will crystallise into beautiful patterns of the kind shown in Fig. 2, if some of it is spread out on glass and evaporated. To the naked eye we see nothing but a silky film, but beneath the microscope there are disclosed row after row of joined crystals in which it is easy to trace the octahedral formation. These crystals vary, among themselves, from very minute to fairly large dimensions.

A unique and very wonderful experiment may be made by any reader who has the necessary facilities. Heat alum and table salt together in an open pan until the mixture has become carbonised—i.e., converted into charcoal. Then place it in a closed receptacle, and heat the char until it becomes red-hot. After having been cooled, this product will ignite spontaneously when exposed to the air. This fact was discovered by Homburg, and is known as a pyrophorus.

In connection with the manufacture of drawing papers, the use of alum size, unless very carefully applied, is liable to result in mischief to the pigments subsequently painted upon them. Chemists who serve the interests of artists have often been very severe on alum-coated papers; and they are certainly justified in their condemnation, because such things will eventually ruin the best of pictures.

TARIFF SUSPENSION WELCOME.

The decision of the Interstate Commerce Commission to defer until September making effective the proposed increased freight rates on paper of various kinds, is causing universal satisfaction among U.S. paper manufacturers. The adoption of these rates, would very materially increase the cost of shipments. Associations and organizations all through the section have been doing all in their power to arrest this step. Thos. G. Smiley, secretary and manager of the Northern New York Tariff Association, states:—

"The tariffs thus suspended were issued by the New York Central and other railroads thirty days ago, to become effective on Thursday, May 27, and carried an advance in rates ranging from 1.2 cents to 5.4 cents per one hundred pounds effecting all grades of paper. The current rates from this district carry all grades of paper including newsprint, at the same rate. The suspended tariffs provide an advance in the rates on newsprint paper in rolls, and a higher advance on newsprint in bundles, also on wrapping, tagboard, printing paper not otherwise specified, and other grades of paper. The Wisconsin, Minnesota and Michigan districts are making strenuous efforts to extend their markets into the eastern territory, and an effort will be made to have the transportation charge become an important feature in determining the value of western paper laid down in New York."

Specialty Patents Issued.

Two important innovations for the paper industry have just been patented. One has reference to the paper toweling and napkin industries, producing newer effect by creping glazed figured sheet on the overhanging dryer; the other for creping paper on the lower side of the overhanging dryer.

SALES CO-OPERATION BETWEEN MANUFACTURERS AND JOBBERS

One of the greatest difficulties which the paper jobber has to contend with is educating his salesman regarding the various lines which his stock comprises. There is no gainsaying the fact that it takes exceptional ability, as well as exceptional effort, on the part of the salesman really to assimilate all of the information which he should have, in order to present the products of the various mills in an adequate and convincing manner.

It is particularly desirable, however, that this should be the case, when the jobber is handling a line which is being advertised by the mill. No matter how many private brands of his own he may have, he realizes the advantage of co-operation to get the most out of the advertising expenditures of the manufacturer in his district, and this means, to a large extent, education of his own salesmen along this line.

Inasmuch as the manufacturer knows more about his own goods than anybody else, it is a logical proposition to have him do as much of this educational work as possible. It is for this reason that a good many progressive jobbers have each of their salesmen supplied with the advertising matter of the mill, so that when they try to talk a given trade-marked bond or book paper, they will be at least familiar with the salient arguments.

There is nothing that hampers development work of the kind indicated more than the relative lack of knowledge of the salesman. Frequently a customer who has been receiving letters, circulars and other advertising matter will be better informed about it than the salesman, and when the latter is asked whether his house handles the advertised line, about all he can do is answer in the affirmative. If he gets an order for this particular stock, it's because the buyer has already been sold by the advertising; certainly the salesman is prepared to play only a small part in closing the transaction.

It would not do to criticize the salesman too severely, of course, because as a rule he is like the king in the comic opera, who complained that he had a thousand things to think of. And the paper salesman certainly has to keep almost as many in mind when he goes out to call on the trade. At that, it would be a great advantage to have some sort of regular, co-operative work done by the manufacturer and jobber, to the end that the latter's salesmen might be better equipped to sell not only the goods which the mill was pushing specially, but all of the paper included in the line of the wholesale distributor.

In fact, one large manufacturing concern has recently made an arrangement whereby the jobbers handling its products have supplied them with the names of its salesmen, and the latter are addressed frequently by the mill, in personal letters in which the mill takes up not only the features of its products, which are being handled by the individual salesmen, but also and more extensively the general problems of selling. The latter is stressed in order that the jobber may appreciate the fact that the work which the mill is doing is not only for its interest, but will result in more effective work being done by the men on the road, to the benefit of the jobber's business.

This is admittedly something of a new idea. Of course, it is not out of the ordinary for a mill representative to be present at a conference of jobbers' salesmen, for the purpose of explaining the method of manufacture and other talking-points of his line, which the jobber may be preparing to feature. And the "stunt" of a well-known mill in making moving pictures of its plant and showing them at salesmen's meetings, as well as in other places where those interested in paper happened to be meeting, is also familiar to the trade. But the plan of actually talking direct and constantly by letter to the jobber's men is a new idea.

The jobber might take the ground that such a policy would be detrimental to his interests, in that it would give the mill a greater influence with the men than would be proper, in view of the fact that they are selling the products of many other mills, as well as that handling the correspondence. That would possibly be true if the paper manufacturer limited his correspondence to pushing his own goods and blowing his own bazoo. But in the case referred to, the policy used is to make every letter speak for the interests of the jobber, as a whole, as well as the mill itself.

For instance, in one general letter which the mill sent out to the salesmen of the various jobbers handling its line, there were the following interesting suggestions:

"There is one point in connection with selling that my own experience seems to justify mentioning to you, and that is a salesman's tendency to cover too wide a field, or, in other words, to spread his selling effort out too thin. For example, the average Bostonian has probably never seen Bunker Hill monument, while practically all visitors to Boston make a point of visiting this spot. I am merely pointing this out to indicate the possible neglected opportunities on the part of all of us.

"The continuous cultivation of a few prospects near at hand, reached at little expense, is apt to be even more profitable than the solicitation of what appear to be larger accounts over a wider territory.

"My advice to all salesmen is to get as close to their customers as possible. See that you sell them, as nearly as may be, every pound of stock they buy. Give them honest advice in accordance with your experience, and become, if possible, as much a business necessity to them as their stenographers. Nothing can be so helpful to a good salesman as a thoroughly satisfied customer. He can frequently offer suggestions as to where you may look for orders in other directions that might not come to your attention at all, or without considerable effort.

"My only reason for giving you this advice is because it has been a factor in my own experience, and because of the tendency of every man to 'bite off more than he can chew' and lose sight of the more desirable and profitable policy of thoroughly 'Fletcherizing' a small amount."

This letter, as may be seen, is written in a personal and familiar way, being, as a matter of fact, the communication of the head of the mill, and being received consequently with much interest by the salesmen. While it is obvious that the jobber should not pass up to the mill the problem of educating his own salesmen in their work, any help that he can get from this source should certainly be gladly received, and in this case has been. The salesmen themselves respond, and the mental stimulation which they receive is going to help them in all of their work.

In "The United States Paper Maker."

The plan of the paper manufacturer referred to includes advocating the sale of his own goods by the jobber's men, of course, but doing it in a diplomatic and constructive way. For instance, the inclusion of a "boost" for the line in the following suggestion is done in a natural and effective manner:—

"Don't be discouraged because a buyer shows you a better-looking sample than yours, offered at the same or a lower price. Remember that always, and impress upon the buyer that the real value of any paper is in its working quality, day in and day out, in the press-room. It is an actual fact that a paper of apparently equal value with another, and sold at one-half cent per pound less, may be in the end more expensive to the buyer because of imperfections, waste and other difficulties which come to light only in the press-room test.

"This was one of the reasons why we decided to standardize our papers and in every way do our utmost to have them as nearly uniform day in and day out as paper of the given quality could be manufactured. This policy has certainly improved our performance, and, through the efforts of your salesmen, we have added materially to our prestige."

In connection with the general proposition of co-operation between the manufacturer and jobber of paper for the purpose of securing greater efficiency on the part of the latter's salesmen, a point which is not stressed as much as it might be is the technical education of the salesmen representing the mill. While the latter have a general knowledge of their line, they are often not as well equippd as would be desirable to disseminate information about it to others who have the task of selling it.

If the salesman from the mill were qualified to talk to the salesmen of the wholesale houses carrying his line, explaining to them the methods of manufacture, the features which go to make quality, and the reasons back of a given characteristic, it would undoubtedly be of great assistance and real educational advantage to the men. Of course, it does not often happen that many of the salesmen of the jobbing house are at the office when he calls for the principal purpose of selling paper; but the opportunities are by no means few in number, and if all of them were taken advantage of, it would mean better paper selling all along the line. Whatever helps the jobber's sales organization is bound to react favorably on the manufacturer, and the more the latter can do to help bring this about, the better for his own cause.

The advertising departments of live jobbing houses make a point of sending to every member of the sales-force the advertising literature which goes out to prospects. This covers the entire line, of course, and in addition to featuring the brands of the jobber, it includes the lines put out under the trade names of the mills. The salesman is thus kept informed not only as to the arguments which have been worked out for the private brands, but is also posted regarding the strong points of the manufacturer's advertised lines, and in this way, inasmuch as the work is spread out over a long time and is comprehensive of the entire line, a great deal of educational value is accomplished.

The efforts of the mill man himself, of his salesmen and of the jobber and his advertising department, all co-operating together to help the paper solicitor sell more goods right, is bound to produce results; and any chance to emphasize this character of work, or to extend the co-operation which is now being developed for it, should be taken hold of enthusiastically by all concerned.

Pulpwood in New Ontario

The Cochrane (Ont.) "Clay Belt" recently presented to the reading public a statement of the conditions in Northern Ontario as regards pulpwood. The future of New Ontario is being watched with the keenest interest the world over. The following comments coming from a journal in the heart of the district contain much food for thought:

This season's operations in pulpwood, as far as the settler is concerned, is closed. It has been a very unfortunate season all round. Abnormal conditions directly attributable to the war, have vastly multiplied the difficult problems confronting the settler here during the first stages of getting the land cleared for cultivation. The pulpwood crop during his first years of occupancy is for the settler the only important means of income and helps to pay for the work of clearing the land. If therefore a new settler is unable to realize on his pulpwood crop it means that unless he has the capital to live for a few years independent of immediate returns for his work, he will have to suffer positive hardship. If such hardship has not manifested itself this year, except in a few isolated cases, it was no doubt due to the fact that many of the settlers have been able to get sufficient advances on their pulpwood from local merchants and purchasing agents here to carry them through the winter, but the merchants and purchasing agents are the sufferers now and have a tremendous load to carry. The burden of distress has therefore merely been shifted to other shoulders and is less apparent to the outsider. Immense quantities of pulpwood are stacked up along all the sidings of the T. & N. O. with practically no market for it. In spite of the ever too ready accusation of incompetence shown by the powers that be, we feel absolutely convinced that both the T. & N. O. Commission and the Provincial Government have exerted every energy to find the only possible remedy in trying to secure a steady and reasonably profitable market for the pulpwood. Nobody would seriously expect the Government to go into the pulpwood business as has been advocated in some quarters, nor can we expect the T. & N. O. to carry the pulpwood for nothing. A local weekly to the south of us, whose editor purposes to go after the T. & N. O. Commission with an axe "until T. & N. O. officials are either educated properly or replaced by more competent men," with considerable more force than argument; puts the blame for present pulpwood situation on the high freight rates on T. & N. O. We can assure our friend that there is or should be no complaint concerning the pulpwood rates over the T. & N. O., which we are convinced, after careful study, are reduced to a possible minimum. T. & N. O. freight rates have nothing to do with the present accumulation of pulpwood all along that road. Not being able to cut down the rates below the present level and being unable to induce connecting lines to reduce their proportion, the Commission has looked around very carefully for other remedies which it might be in their power to apply. Then went to considerable trouble and expense in trying an experiment which undoubtedly had been recommended to them in some quarters and put on the road a number of movable rossing machines. While the good intentions of the Commission are highly commendable, it is nevertheless a fact that no good came of it, and we must come to the conclusion that matters have been greatly misrepresented to the Commission by some one who possibly was interested to have his wood rossed without wanting to pay full price for it. As far as the work done in Cochrane is concerned, we have yet to see the settler who has been benefitted by the rossing machines, in fact, the majority of the settlers around here did not desire to have their wood rossed at all. These rossing machines have since been sold to jobbers.

It is clear the reason of the failure to relieve the situation does not lie with the Commission, it is simply the outcome of the existing abnormal conditions, but if anybody must be blamed, we would be inclined to place the blame on the people here themselves who did not come out with definite practical proposals of what should be done to relieve the situation.

That the problem has received the serious attention of the Provincial Government we were assured by the Premier, Hon. W. H. Hearst, during his recent visit here; we were also told that had not the financial stringency, following the war, interfered, a second pulp mill near here would now be under construction, and an additional home market created. But, of course, what might have been is at any rate a poor consolation and does not help us over the present deadlock. As we said in the beginning, the advances made by the local merchants and purchasing agents here, mitigated the distress among the settlers and carried most of them through the past winter, but what is to become of the settler during the next winter. The distress will be infinitely more acute if some way is not found meanwhile to unravel the tangle of the pulpwood situation. Suggestions have been made that the T. & N. O. Commission should practically shoulder the pulpwod trade and make the advances to the settler. Some of the dailies in old Ontario have it that such advances are now being made, which, of course, is erroneous. It would certainly require special legislation to empower the T. & N. O. Commission to go into the pulpwood business, which, quite possibly, might be got, but this would not go far enough. The T. & N. O. could not go beyond their own road, and what then about the settlers all along the Transcontinental? We would rather think that this matter should be left to the Northern Ontario Development Branch to be dealt with. Why could not part of the special fund now at the disposal of this Department be devoted to making advances on pulpwood delivered at the stations along the T. & N. O. and Transcontinental Railways by real bona fide settlers, on the same principle that these same settlers are now receiving the advance of seed grain. Great care would have to be taken that such privilege is not extended to the number of pulp farmers. There is no doubt that the pulpwood situation has been greatly aggravated by the latter, who clear their land not for the sake of cultivation of the soil, but merely to strip it of the pulpwood and hold the land for speculation. The output of pulpwood has thus been in a large measure augmented in an already overstocked market. To give these pulp farmers in any way the benefit of any such assistance would only retard the development of the country by increasing the output of pulpwood to unmanageable proportions and thereby impair the chances for the real settler who is looking to the cultivation of his land alone to yield him his livelihood but must realize on his pulpwood meanwhile to help pay for the work of clearing.

Paper Insulation

In an article in "Electricity," by Mr. Frank Broadbent, M.I.C.E., dealing with "Wiring for Contractors, Employees and Students," he points out that rubber is a comparatively dear material, and the price tends to fluctuate considerably. For these, among other reasons, it is not generally used nowadays for large sizes of cable, such as underground mains and feeders, but cables insulated either with paper or vulcanized bitumen are used instead. Paper, when dry, possesses a fairly high insulation resistance, but as it is a hygroscopic material, that is, a material which tends to absorb moisture, it is essential to prepare it in some way to render it moisture proof. This is accomplished by impregnating the paper with special insulating oil or compound, resinous oil being generally used. There are various grades of paper, some being better than others for insulating and lasting purposes. It has been found that papers made from wood pulp deteriorate more rapidly than those prepared from pure manila fibre, and the best paper-covered cables are therefore insulated with paper of this character.

Another reason for using a good quality of paper is that inferior qualities tend to become rotten when soaked with the insulating compound, and would, therefore, break up or crumble away if used on a cable which is necessarily subjected to bending.

Again, as paper possesses very little elasticity, it would be no use to make it up into homogeneous tube, as this would crinkle on the inside and crack on the outside of a bend. It has to be applied to the cable in the form of a thin tape or strip laid spirally layer upon layer. The strip must be thin and narrow, so that when the cable is bent the layers can "give" or slide slightly on each other, and the insulating oil must be sufficiently fluid to allow the paper layers to do this, for if it caused them to stick together the paper would tear whenever the cable was bent. As it is essential to keep the oil in and the water out, the paper covering must be completely enclosed in a lead sheath. This is put on by special machinery, the lead being pressed on when hot and in a semi-fluid condition, so as to form a continuous tube, the complete cable being drawn through a cooling water trough on to drums. The lead used for the sheathing must be as pure as possible, not only in order to prevent electrolytic action when the cable is run in damp situations, but also to permit of its being bent and coiled without fracture or other injury. In good cables the sheath contains 99.8 per cent pure lead. Although impregnated with insulating oil, this is not sufficient to prevent moisture working its way into the paper if it is exposed to the atmosphere even at the ends of the cable. Moisture creeps in between the copper and the paper; between the layers of paper, and also between the paper and the lead sheath by capillary action. This action is increased when the cable is "alive," that is, when there is a difference of electric potential between the cable and earth. The moisture appears to follow the direction of the current, i.e., from a higher to a lower potential, and if exposed long enough will penetrate for a considerable distance. This action is due to what is called "osmosis." It is, therefore, very important to seal up the ends of all paper-covered cables, a point referred to later under "erection."

There is no simple test which can be applied to a paper insulated cable, the only safeguard for the buyer being the reputation of the maker.

The insulation resistance of paper is less than that of rubber, so instead of 600 or 2,500 megohms per mile we have to be satisfied with 150 to 300 in small sizes, and from 70 to 150 megohms per mile in large sizes.

The great advantage of paper over rubber is cost; it has also the advantage that it will stand higher temperatures, and will resist higher pressures without puncturing by spark.—The World's Paper Trade Review.

PROMINENT SWEDE DIES.

Sweden has lost a great figure in the death, in his seventy-second year, of Dr. Erik Johan Ljunberg, who, for forty years, presided over that greatest of all industrial undertakings in Sweden, the Stora Kopparbergs Berglags Aktiebolag, whose headquarters are at Falun. He was essentially a great man, possessed of indomitable will and perseverance, and all with whom he came in contact were impressed with the strength and dominance of his personality. He also made his influence felt in his native land.

After a short technical training, at the early age of 26, he became the manager of Munkfors Bruk, when his natural talents and ability soon marked him out for further advancement, and in 1875 he was appointed manager of Stora Kopparbergs Bergslag. When later this was converted into a limited company, Dr. Ljunberg was appointed its managing director. It is said the company dates back to 1220 odd, and has been in operation ever since, but it is entirely due to Dr. Ljunberg's progressive spirit, his unusual capabilities as a business man and engineer, his untiring devotion and genius, which has placed it in the forefront of the industrial enterprises of the Western World. He early recognized the immense resources of the company with modern machinery, and had installed the first blast furnace for using coke ever seen in Sweden, as also the first Thomas steel converter. He invented the "Ljunberg" retort for making charcoal, and started big cellulose and saw mills, and was the first to introduce into Sweden fast running paper machines. He was created a doctor honous causa by the High School of Stockholm. He was a wise and kind administrator, and recognized that the success of an enterprise depends very largely on the well-being and prosperity of its employees.

W. E. STAVERT STILL HEAD.

An article has appeared in several of the Canadian papers recently to the effect that Mr. W. E. Stavert has resigned as president of the Spanish River Pulp and Paper Co. Mr. Thomas Gibson, secretary of the Company, is authority for stating that there is absolutely no truth in the report. Mr. Gibson says he has no idea how such a story came to be circulated.

The report which is referred to reads as follows:—"W. E. Stavert has resigned as president of the Spanish River Pulp and Paper Mills, Limited, and also leaves the board of directors.

"The board of directors has been made up of members who will directly represent the different companies in the near-consolidation. The Lake Superior Paper Company will be represented on the Spanish River Board by Mr. T. W. Sime and Mr. F. B. Wilson. Mr. Alex. Smith and Mr. G. Gray will represent the Ontario Pulp and Paper Company. Mr. T. Gibson will represent the note holders, and Messrs. Geo. H. Mead and M. E. Talbot will represent Spanish River shareholders."

WISCONSIN MAKES SAFETY REGULATIONS.

Every pulp and paper manufacturer in Appleton, Wis., last month received a letter from the Wisconsin Industrial Commission, outlining the rules, approved by a special committee of paper manufacturers appointed last December on safety and sanitation in paper and pulp mills; also containing three new rules applying especially to paper mills. The letter states:—

In addition to the orders on safety, this committee drafted the following three orders on sanitation in paper mills which became effective April 29, 1915:

Order 2220—Rag sorting tables and exhaust systems.—All rag sorting tables where operators stand and sort rags and other materials which throw off dust, must be equipped with an efficient exhaust system.

Order 2221—Rag cutting and threshing machines located in separate rooms.—All rag cutting and rag threshing machines must be located in rooms separate from any rooms in which other work is being done.

Order 2222—Washing facilities for women.—In all paper mills where women and girls are employed, adequate washing facilities must be provided, including warm water.

We wish to call your special attention to Order 2220 covering exhaust system on rag sorting tables. We have taken this matter up with experts on exhaust systems and they inform us that it is comparatively easy and a simple matter to equip these rag tables with exhaust systems which will eliminate the injurious dust. If you wish assistance in regard to this matter the commission will be glad to give you such information as it has in hand.

During the last two years the commission has received very cordial co-operation from the paper mill manufacturers along the line of safety and sanitation. We feel quite sure that you will appreciate the fact that these new orders on safety and sanitation in paper mills are in line with good practice.

Strike Difficulty Increase.

The labor troubles in Watertown, N.Y., are expected to spread. President Carey of the International Brotherhood of Pulp and Paper Makers, states that unless the Gould Paper Company at Lyons Falls, and the Island Paper Company and Champion Paper Company comply with the demands of the men, a strike would be called in these paper mills. Meanwhile, it is generally believed that the manufacturers in that section of the State will stand together.

The fact that the St. Regis Paper Co., of Watertown, N.Y., are the lessors of practically all the houses in Deferiets, and that notices have been served on the tenants to vacate in thirty days, makes it appear as though the company are replacing the strikers with outside workmen. Notices have also been served to pay the rent due, which in some cases is of several weeks' standing. Demonstrations may possibly occur, and it is understood the management will call in the militia if necessary.

Irregularities Charged.

An investigation is being made into the charges brought by E. W. Backus, the president of the Minnesota and Ontario Power Co., against Judge C. R. Fitch. Mr. Backus has stated on oath his company have paid Judge Fitch bonuses amounting to $800, being 50c per cord of pulpwood bought from the Judge on his asking for it, and on his stating he was in a position to reciprocate.

Alcohol versus Safety

The crusade against alcohol by captains of industry, insurance men, safety experts, not to mention the statesmen in the countries at present at war is assuming tremendous proportions. Walter Allen Rice, in "Safety Engineering" goes so far as to say that the man who drinks, even moderately, is no longer wanted in any line of work. He is not a good risk for life insurance. He is not wanted in little or big business. The railroads and the factories will not employ the drinking man, if they know him. The man found drinking is discharged promptly. For successful work, the best results can be wrought by men who are abstainers, with level heads and sound bodies. The total abstainer is the man preferred in all the walks of life.

The remarkable growth in public sentiment in favor of total abstinence means the conservation of human life, a lengthening of the average longevity, and consequently a gradual reduction in the death rate from alcoholism. The most eminent medical authorities condemn the use of liquors in any quantity as injurious to human life.

From a business standpoint the life insurance companies and the fraternals are vitally interested in the fight to overthrow King Alcohol; for alcoholism is directly and indirectly the cause of a very large percentage of death cases which drain the mortuary funds of vast sums annually.

The dire havoc which alcohol plays with human life, and its terrible effect upon life insurance is told in the following extracts taken from a speech by a congressman, Richmond P. Hobson, in the House of Representatives on December 22, 1914:

"Alcohol, even in small quantities, attacks all the vital organs and the nervous system, the tissues, and the blood. A large percentage of premature deaths arising from disease are due to this cause. The attack on the blood lowers the efficiency of the white blood corpuscles to destroy the disease germs, exposing the drinker far more than the abstainer to the ravages of consumption, pneumonia, typhoid, and other germ diseases. The records of insurance companies show that in the period from 25 to 45 the mortality of total abstainers is only a fraction of that of the average. This means that the bulk of deaths in young manhood are due to alcohol.

"The records of the insurance companies show also that a man, starting at the age of 20 as a total abstainer, lives to the average age of 65, whereas, starting at the age of 20 as a moderate drinker, he dies at 51, losing 14 years, or a cutting down of nearly one-third of his days.

Starting at the age of 20 as a heavy drinker a man dies at 45, a sheer loss of two-thirds of the span of his whole life.

We are dying at the rate of 1,000 per 61,000 of the population. Total abstainers in our midst are dying at the rate of 560 per 61,000 of the population, though living under the same conditions. The latter figures are those applied to adult males as shown by the insurance companies' figures. Investigations show that the shortening of life of the offspring is far greater and more serious than that of the parent, and, since the adult males are the fathers of the young of both sexes, it is on the side of conservatism to apply the proportion to the whole population, so that we can conservatively say that 440 additional deaths are caused every year per 61,000 of the population—deaths that are premature and unnecessary. This means that alcohol actually kills fully 700,000 American citizens every year.

"When these figures were first printed they were subject to some ridicule and to many attempts to disprove them. Several German scientists have employed the same methods of reasoning and the liquor interests of the continent have a standing offer of 6,000 marks to any scientist that can disprove the figures of the great insurance companies which are the foundation of this awful conclusion.

"When the great Titanic sank in mid-ocean with her precious cargo and shocked the whole world, she carried down less than 1,600 souls. Alcohol carries down to a premature grave every day more than 2,000 American souls."

GRAND FALLS SCHEME DELAYED.

Bangor, Me.— It will be quite some time before work is commenced on the big power, pulp and paper project at Grand Falls, on the St. John river in the province of New Brunswick, according to information gained at the recent meeting of the International Commission pertaining to the River St. John held in this city.

Before commencing any work at Grand Falls, the company holding the rights there, in which Sir William Van Horne is interested, was required to secure the approval of the international commission, which has for several years been making an investigation of conditions existing on the river. The commission has already passed on one power development project and stood ready to consider this one, but the plans of the company have never been laid before that body, although the matter has been discussed informally at the commission meetings.

The project was, and still is, so far as can be learned, to develop the falls of the St. John at Grand Falls, where engineers have estimated that there is power second only to Niagara in the eastern part of North America, and to build a great pulp and paper mill there, the whole representing an expenditure of several millions of dollars.

Engineers have been working at the Falls making plans and estimates, and it is understood that they have two plans in view—one for straddling the falls with a large mill, and turning the water of the river directly into the power wheels of the mill; the other, to dam the great gorge below the falls, and erect the mill further down the river.

The commission has decided to go on with the work of preparing its report on the conditions and uses of the St. John river, and the possibility and feasibility of conservation of water for power and lumbering purposes on the river and its tributaries, which will probably be completed during the present year, and the commissioners have been at work on it since 1909.

Hon. John B. Madigan, of Houlton, Me., appointed one of the commissioners to succeed Hon. George A. Murchie, of Calais, a well known lumberman on the St. John river, whose death occurred last summer, has just begun his duties.

The commissioners have decided to take more expert testimony regarding the sorting of logs at Van Buren on the river before closing the evidence entirely.

UNITED STATES NOTES

The mill of the Southern Paper Company, Moss Point, Miss., which recently suspended operation following a refusal of eight of the machine men to continue their work after a reduction had been made in the wages of all of the employees of the plant, has resumed operation. For the present the mill will only be operated in the day time. As soon as additional skilled labor can be secured the mill will again be run day and night.

* * *

The transcript of the record in the suit of the Black Clawson Company of Hamilton, Ohio, against the Sterling Paper Company has been filed in the United States District Court. The case was ordered removed on the petition of the Sterling Paper Company, setting up that it is not a citizen controversy, is in excess of $3,000, therefore within the jurisdiction of the U.S. District Court. The plaintiff states that the Sterling Paper Company is indebted to it in the sum of $14,689.40, with interest, for labor and materials furnished in connection with the remodeling and extension of the Sterling Paper Company's mill and manufacturing plant at Hamilton; that it has a lien upon the paper company for this amount, that a large number of other creditors, who are parties defendant in this action, hold claims and judgments against the paper company for more than $80,000; that the lien of the plaintiff is entitled to priority over the other creditors, are threatening foreclosure and other proceedings for the sale of the plant, and that as the chief value of the property is its value as a going concern, the pending action on the part of other creditors for the sale of the property would be detrimental to the interests of the plaintiff and all other creditors.

* * *

The directors of the Association of American Wood Pulp Importers of New York City, have passed the following resolution. That by the death of Mr. A. S. Demarest, the Association has lost a valued member, and the trade a careful, practical and thorough business man. That we tender to the bereaved family and to Messrs. E. Butterworth and Co., our heartfelt sympathy, and that this resolution be spread upon the minutes of the Association.

* * *

A rumor emanating from good authority, states that the plant of the American Straw Board Company at Tippecampe City, Ohio, will start operations at an early date. The Tippecanoe plant has been idle for some time. Active operations in the near future are anticipated.

* * *

Fire at the mill of the American Strawboard Company, at Thamesville, Conn., gave the firemen and the employees a lively fight for over an hour one day last week. The blaze, which was caused by sparks from a passing Central Vermont engine, started in the stock room and burned about one hundred bales. The loss is covered by insurance.

* * *

Hammermill Uaper Co. v. the Howard Paper Co., of Urbana, for alleged infringement of Hammermill's water mark in bond paper has been settled out of Court.

The annual outing of the Boston Paper Trade Association will be held on June 18 and 19 at Stockbridge, Mass. It is hoped to have as guests of the association on this occasion the presidents of a number of the paper trade organizations in the east, to whom special invitations have been sent. The golf tournament in connection with the outing is arousing considerable interest.

* * *

The first annual outing of Kalamazoo paper manufacturers was held at Kalamazoo, Mich., on June 10. Paper jobbers from all over the United States were in attendance. Secretary Charles Wright of the committee was delighted with the interest shown in the affair, which proved to be one of the most pleasant times ever enjoyed by the paper jobbers of the country. Special cars and automobiles took the visitors to Gull Lake, where the main events of the celebration were held.

* * *

A meeting which proved very interesting, was held last week at Cumberland Hall, Westbrook, Me., under the auspices of the Cumberland Institute of Paper Perfection. The speaker of the evening was Robert B. Wolf, manager of the manufacturing department of the Burgess Sulphite Fibre Company, of Berlin, N.H. Mr. Wolf's talk dealt principally with the manufacture and use of sulphite, and many valuable points were gained by his hearers, which will no doubt aid them in their work. As its name implies, the institute was organized among the paper employees with the object of turning out a better product, and the meetings which are held give the men an opportunity to get together and talk shop.

* * *

Application has been made for a charter for the American Roofing Manufacturing Company at York, Pa. The incorporators of the industry are Charles F. Lafean, Carl L. Lafean and Robert H. Lafean, all of York. The company will engage in the manufacture and sale of all grades of roofing sheathing, felts, paints and the lining and insulating papers, and other products made from paper, asphalt and coal tar. The plant is to have an output of five carloads of roofing paper a day. Four machines for the manufacture of roofing paper will be installed in the plant and the building operations and equipment will be completed by August 1, 1915.

* * *

The National Paper Products Co., owned by the Zellerback Paper Co., of San Francisco, Cal., are constructing a factory in Carthage, N.Y., for the purpose of manufacturing paper towels and toilet paper.

* * *

The American Board Co.'s plant at Hop River, Conn., at which a fire occurred some time ago, has recently changed hands. Extensive alterations and additions to the plant are now being made, and operations will shortly be resumed. The name of the company is now the Tolland Board Company.

* * *

Operations have just been commenced at the largest mill on the Penobscot, viz., the Eastern Manufacturing Co., at South Brewer, 135 men are engaged.

Ottawa Notes

Ottawa, Ont., June 10.

An increase in Canadian imports of paper and its products and a corresponding decrease in imports is indicated by preliminary trade figures for the fiscal year of 1915, just issued by the Trade and Commerce Department. There is also shown a decrease in the export of pulpwood.

The total value of paper exported from Canada in 1915 according to these figures was $15,509,582 or more than the $12,686,896 of 1914. Of this by far the larger amount, $12,879,204, was exported to the United States. The export of wood pulp was $9,266,161, as compared with $6,364,824 in 1914, $7,443,814 of this being exported to the United States. The export of wood blocks for pulp decreased as stated, amounting to $6,817,311 in 1915 as compared with $7,388,770 the previous year.

Imports in 1915 amounted to $5,764,379, or less than the 1914 figures of $8,043,368, the importations from the United States amounting to $4,032,345. These advance trade figures bear out the recent statistics issued by the Forestry Branch as to Canadian pulpwood production in 1914 and show that Canada is manufacturing more of her own pulpwood in her own mills every year.

In connection with the statement in the Forestry Branch report on pulpwood already mentioned, that jackpine was coming more and more into use as raw material for the production of sulphate and kraft pulp, some interesting facts are to be obtained from a report just issued by the Interior Branch on survey work in the unsurveyed portions of Manitoba, Alberta and Saskatchewan. According to this report, which deals with timber conditions in these districts in a general way, jackpine is the prevailing timber and is to be found in fairly considerable quantities, in spite of the fact that a great part of this north country has been fire swept. Commercial timber is present only in small patches in the muskeg and the statement is made that there is not enough of it to do more than supply the local needs of settlers. The outlook for the ultimate utilization of the forest wealth of the country in pulp and paper mills, however, is more rosy, as besides jackpine spruce around 25 inches in area is to be met with while there are good waterpowers on all the streams.

Water conditions, although there has been little rain during the past two weeks, are still very good on the Ottawa and Gatineau rivers. In the Rideau canal, however, the water is said to be very low, and it has been stated there is a possibility that navigation may be seriously interfered with as a result, later in the summer, which will affect lumber transportation to a certain extent. Pulp and paper firms which are power users at the Chaudiere Falls however, are much better off than at this time last year, and both the Booth and Eddy mills are operating near full capacity.

In regard to the Booth plant Mr. C. J. Booth was authority for the recent statement that there was almost no market for the lumber end of the company's production, and that it was in spite of this fact that almost 2,000 employees were being retained and that cutting would go on this summer. The cut will be put in stock to await better conditions and meanwhile the company is making its profits out of the pulp and paper end of its business, which has attained more considerable proportions since the completion of the new sulphite mill now in operation. The Booth firm is now manufacturing all the pulp for its own needs.

Pulp and paper are among the few products which have not been greatly affected by the war outside of the difficulty of obtaining ocean shipping facilities. Paper is specially exempted under the German contraband regulations, it being declared that under no conditions is it to be considered contraband of war. It is also among the comparatively few important products not appearing in the British and Canadian list of commodities which may not be shipped to other than British or British and neutral ports.

MAC.

THE MICROSCOPY OF CHINA CLAY.

In a paper on the "Microscopic Characters of China Clay," by G. Hickling (J. Soc. Dyers and Col., 1915, 31, 70), which is abstracted in the "Journal of the Society of Chemical Industry," the various minerals that compose the clay are named and described. The minerals present are quartz, tourmaline, primary muscovite (original constituent of the granite), secondary muscovite (produced in the decomposition of the feldspar), and kaolinite. The first three occur in large fragments and are readily identified under the microscope, but kaolinite and secondary muscovite present difficulty, on account of their minuteness and irregularity of form. Both minerals occur in the form of curved prisms known as "rouleaux," which appear to be built up of a pile of fine plates, suggesting piles of coins.

By determining the refractive indices (by immersion in mixtures of oil of clove and oil of cedar), it was found possible to differentiate between the rouleaux of muscovite and of kaolinite in certain cases, but some of the crystals gave intermediate values. Considerable evidence has been found that the percentages of muscovite obtained by chemical analysis are too high. It is probable that the muscovite is gradually transformed into kaolinite, and that the clay very largely consists of crystals intermediate in composition:

$$K_2O.3Al_2O_3.6SiO_2.2H_2O + 4H_2O + CO_2 =$$

muscovite

$$3(Al_2O_3.2SiO_2.2H_2O) + K_2CO_3$$

kaolinite.

The conversion of feldspar into kaolinite is due to the gradual extraction of the alkali and loosely combined silica, muscovite being an intermediate stage in the process:

$$3\,(K_2O.Al_2O_3,6SiO)_2)+2H_2O-$$

orthoclase.

$$K_2O.3Al_2O_3.6SiO_2.2H_2O + 2K_2SiO_3 + 10SiO_2$$

China clay consists principally of the intermediate decomposition products from muscovite to kaolinite. The most obvious feature in the microscopic structure is the great variation in the size of the particles, 0.03 to 0.0005 Mm. diameter. The whole of the particles appear to be crystalline. The usual statement that china clay consists mainly of minute flakes is correct, but these flakes are plates split off from the rouleaux. It does not appear that the subdivision of the clay particles according to size has any material effect on the proportion of the various minerals present. Rouleaux are extremely rare in common clays, which contain a much greater variety of minerals than china clay.

PULP AND PAPER NEWS

John Martin, of the John Martin Paper Co., Winnipeg, who has taken up the work of interesting the paper jobers of the Dominion in the formation of a Canadian Association, has received a large number of highly favorable replies. He has sent out notices to the trade suggesting that an organization meeting be held in Toronto during the week commencing September and that each wholesale house should send one representative. He also intimates that it would be advisable to secure the Secretary of the National Paper Trades Association of the United States to give an address on the benefits of their organization, and suggests that some of the following subjects could be profitably discussed by the proposed new body. The legitimate jobber, plans for closer co-operation, price lists and supplies, protection of proprietory lines, delivery charges, freight rates and classifications, demurrage charges, returned goods charges, discount highwaymen, collection of overdue accounts, closer co-operation with the mills, compensation of salesmen, elimination of abuse by shippers that antagonize mills, closed co-operation of members and pulling out bad accounts without loss. Mr. aMrtin thinks the first important matter is to secure definite assurance of a representative gathering and, when this is done, a committee of those who have promised to attend will arrange the details of the meeting and programme.

The Canadian paper trade have been advised of the death of F. Logie-Pirie, chairman of the Board of Directors of Pirie, Wyatt and Co., Limited, of London, Eng., which took place at his residence, Tottingworth Park, Heathfield, Sussex, on May 12. The deceased was well known to a number of leading members of the industry in the Dominion.

The numerous friends of R. S. Waldie, President, of the Toronto Paper Mfg. Co., Toronto, are congratulating him on his engagement to Miss Meta Gibson, youngest daughter of Sir John Gibson, of Hamilton—former Lieut.-Governor of the Province of Ontario.

The Provincial Paper Mills Co., of Toronto, who operate plants at Mille Roches, Thorold and Georgetown, Ont., have sent out the following letter to their customers, in reference to the color situation:—"We are experiencing difficulty in procuring color; the reasons for which, you are no doubt, familiar. We find a growing scarcity in the source of supply; deliveries indefinite, quality adulterated, an deven at a highly advanced price, some are unobtainable. We therefore, are compelled, until further advised, to advance the price on all colored paper, twenty-five cents per 100 lbs. All orders taken, subject to us having in stock or being able to procure, the necessary color. We regret the necessity of making this advance, and trust that you may be able to persuade your customers to take white paper instead."

Some time ago a charter was granted to the Ontario Pulp and Paper Makers' Safety Association, the object of the Association being to promote and carry on the work of prevention of accidents in pulp and paper mills of the province in connection with the assessment levied by the Workmen's Compensation Board with respect to the administration of the act. At a meeting of the Association held recently in Toronto, W. P. Gundy, of W. J. Gage and Co. and the Kinleith Paper Mills, was elected president; I. H. Weldon, Provincial Paper Mills Co., vice-president, while the other directors are: H. R. Thomas, of J. R. Booth, Ottawa; C. B. Thorne, Riordon Pulp and Paper Co., Merritton and Hawkesbury; C. H. L. Jones, Spanish River Pulp and Paper Co., Sault Ste. Marie; W. M. Shea, Lincoln Paper Mills, Merritton, and F. H. Anson, of the Abitibi Pulp and Paper Co., Iroquois Falls. The secretar yof the Association is H. D. Scully, Toronto.

The hearing of the suit brought by Mrs. Isabella Taylor, against Robert Davies,(owner of the Don Valley Paper Mills, Toronto, regarding the ownership of the Don Valley Brick Works, the plaintiff being the wife of W. T. Taylor, of the firm of Taylor Bros., former owners of the paper mills and brick works, has been adjourned indefinitely. According to the statement of claim, a mortgage had been given to Robert Davis for $73,000, and when the Taylor Bros. assigned, Robert Davies became the owner. Wm. T. Taylor, a member of the late firm of Taylor Bros., said that when they assigned the property had a value of about a million and a half dollars, and the liabilities amounted to forty-three thousand dollars.

The Provincial Paper iMlls, Co., Toronto, have adopted a new plan in connection with their different grades of book papers, and are giving each grade a name or title after some county in Ontario.

The annual meeting of the Canadian Press Association will be held in Toronto on Thursday and Friday September 2 and 3. Among those who have been invited to address the gathering are Talcott Williams, Dean of the School of Journalism, of Columbia University, and E. K. Whiting, of Ottumwa, Minn., one of the leading weekly newspaper publishers of the Unitel States.

At a meeting of the Canadian Associated Press held in Toronto recently, J. Ross Robertson, of the Toronto Telegram, was re-elected president for the coming year, J. S. Lewis of the Montreal Star, vice-president, and J. E. Atkinson, of the Toronto Star, secretary-treasurer. The old Board of Directors was also re-elected.

Hon. G. Howard Ferguson, Minister of Lands, Forests, and Mines for Ontario, has returned from a trip through Northern Ontario, and says that a decided atmosphere of optimism prevails throughout the whole district. Business conditions are improving, and money is getting easier. In six months of 1913-14 the revenue from lumber and mines was $882,656, and for the same six months in 1914-15 the returns are $1,002,565. The increase in lumber duties for the six months spoken of is $250,000. There is an increased timber production and a large number of saw mills are in operation. Most of the timber cut goes to American centres. Pulp wood cutting is growing, and in many cases is giving work to a large number who lost employment with the falling off in railway construction.

C. T. Pearce, late general manager of the Toronto News, who some time ago disposed of his holdings in that paper to C. Lesslie Wilson, has been appointed Toronto manager of A. McKim, Limited, newspaper advertising agency, succeeding W. B. Somerset, who has been manager for some years, but has removed to Montreal.

It has been rumored that the Ontario Paper Co., Thorold, intend installing a third paper machine, and also stacks of calenders for calendering news print. Warren curtis, Jr., manager of the company, says that no decision has yet been reached in regard to any extensions, and probably will not for some time.

The many friends of Wm. Donald Hay, of the Canada Paper Co., oMntreal, will sympathise with him in the loss of his wife, who died on June 1st, at the age of sixty years. Mr. Hay is one of the oldest employes of the company, in whose service he has been for about forty years. He was one of the city salesmen for some years, and is now attached to the warehouse staff.

A charter has been granted to the Thomas Wilson Lumber Co., of Ottawa, with a capital stock of seventy-five thousand dollars. The company is empowered to manufacture and deal in timber and woods of all kinds and all articles that can be made from or extracted from wood or the waste products of wood.

Owing to the long dry weather, bush fires have been raging in Northern Ontario, but the recent heavy rains have extinguished them. Commissioner Lee of the Timiskaming and Northern Ontario Railway, who has returned to Toronto from a trip over the lines, said the fires had doubtless been caused by the settlers in clearing up the land, and had originated at several points along a length of about two hundred miles. Several piles of pulp wood had been destroyed, but no estimate of the actual damage had been arrived at. The railway company had to send one hundred men to the township of Notman recently, where the bush fires were assuming alarming proportions, but the rain soon came, and now all trouble is over.

A factory baseball league has been formed in Thorold and the season promises to be an interesting one. In the opening games, on June 5, the team from the Interlake Tissue Mills was defeated by the Pilkington Glass boys by 3 to 2, while the nine from the Ontario Paper Co. vanquished the aggregation from the Montrose Paper Mills by 15 to 13. The players from the Ontario Paper Co. wear neat badges bearing the letters "O.P.C." Great interest is being taken in the factory schedule.

The pulp and paper plants along the old Welland Canal were closed down during the past week owing to the water being shut out of the canal by the government. The mills took advantage of the occasion to thoroughly overhaul their equipment.

Among the leading representatives of the Pulp and Paper industry who attended the annual meeting of the Canadian Manufacturers Association in Toronto last week were Carl Riordon, of the Riordon Pulp and Paper Co., Montreal, and C. H. L. Jones, manager of the Spanish River Pulp and Paper Mill, Sault Ste. Marie, Ont.

A number of influential business men are visiting the Abitibi Power and Paper Company's plant at Iroquois Falls. They propose organizing a new company and erecting a paper plant this side of the Falls. With the completion of the installation of the fourth paper machine in September, the Abitibi Power and Paper Company, will be able to produce daily, when working at full capacity, 250 tons of newsprint. The full daily capacity of the mills will be 250 tons of newsprint, 250 tons of mechanical pulp, and 50 tons of sulphite pulp.

Mr. A. G. Hinzke, former Superintendent of the sulphite mills of the Marathon Paper Mills Co., of Rithschild, Wis., has joined the staff of the Bathurst Lumber Company, Limited, as superintendent of their sulphite mill. Mr. Hinzkes' wide experience and recognized ability as a high grade sulphite man makes it certain that this department of the Bathurst Lumber Co.'s project will be in good hands.

TECHNICAL SECTION JUNE 19th.

The arrangements for the meeting of the Technical Section of the Canadian Pulp and Paper Association to be held in Montreal on Saturday, June 19th, are going ahead favorably, and a very large attendance of the various mill staffs throughout the country is expected. Those who have not yet decided to attend, are urged to come. The meeting promises to be one of exceptional interest.

TENDERS FOR PULPWOOD LIMIT.

TENDERS will be received by the undersigned up to and including Wednesday, the fifteenth day of September, 1915, for the right to cut pulpwood on a certain area situated north of the Transcontinental Railway, west of Lac Seul and south of English River in the District of Kenora.

Tenderers shall state the amount they are prepared to pay as bonus in addition to the Crown dues of 40c. per cord for spruce and 20c. per cord for other pulpwoods, or such other rates as may from time to time be fixed by the Lieutenant-Governor in Council, for the right to operate a pulp mill and a paper mill on or near the area referred to.

Such tenderers shall be required to erect a mill or mills on or near that territory, and to manufacture the wood into paper in the Province of Ontario — the paper mill to be erected within such time and in such place as the Lieutenant-Governor in Council shall direct.

Parties making tender will be required to deposit with their tender a marked cheque payable to the Honourable the Treasurer of the Province of Ontario, for ten per cent. of the amount of their tender, to be forfeited in the event of their not entering into an agreement to carry out the conditions, etc.

The highest or any tender not necessarily accepted.

For particulars as to description of territory, capital to be invested, etc., apply to the undersigned.

N.B.—No unauthorized publication of this notice will be paid for.

G. H. FERGUSON,

Minister of Lands, Forests and Mines, Toronto, June [illegible], 1915.

The Markets

CANADIAN MARKETS

The market for news print continues favorably, and all the mills are well employed. Prices remain firm, and a number of inquiries from abroad still come in. It is understood that the Abitibi plant, which will begin operations this month, has contracted already for its news print output, until the end of the present year. During the past fiscal year ending March 31st, 1915, the export returns show that there was a gain of twenty-five per cent paper exports for the fiscal year were $15,509,582, as compared with $12,686,896 in 1914. Of last year's total the United States took $12,879,204 or on average of over a million dollars a month.

Another encouraging feature in general paper making activities in Canada is that the imports of paper for the last fiscal year show a decline of about twenty-five per cent from the preceding fiscal year. Last year the Canadian imports of paper and paper manufacturers were $5,764,379, as compared with $8,043,368 in the preceding twelve months. In the imports last year $4,032,345 came from the United States and the remainder principally from the United Kingdom.

The demand for ground wood pulp is fair, and there is not much change to report. Prices rule unchanged. There was exported during the past fiscal year $9,266,161, as compared with $6,364,824 the preceding year. Of last year's total, $7,443,814 was sent to the United States. The sulphite marekt is strengthening, and stock, both on the docks and in the hands of the purchasing millsfi, are getting low. Imports from abroad have fallen off to a great extent, and it is predicted that local plants will be called upon, in a measure, to supply the threatened shortage. Canadian mills are well sod up.

In the toilet and tissue paper line mills are very busy, and so are plants making specialties, the new greaseproof and glassine papers now turned out in Canada having taken will with the trade. Wrapping paper situation is rather quiet, while there is considerable price cutting kraft. Book and writing plants are running along about the samefi but not any of them are operating to capacity. The color situation is growing acute, there being not only a great increase in price since the war, but certain colors such as cardinal and deep blue aer practically unobtainable. The figure on all colored bond and writing papers have been advanced a quarter of a cent by the mills.

In the rag and paper stock here things are quiet, and there is little trading. Mixed papers have dropped very low and there is no demand for folded news. Book stock and Manila cuttings have all declined in figure. The outlook for the waste paper dealer for the summer months is not exceptionally bright.

Quotations f.o.b. Toronto, are:—

Paper.

News (rolls), $1.85 to $2.00 at mill, in carload lots.
Nows (sheets), $2.00 to $2.20 at mill, in carload lots.
Book papers (carload), No. 2, 4.50c.
Book papers (ton lots), No. 2, 4.75c to 5.50c.
Book papers (carload) No. 1, 5.00c to 5.50c.
Book papers (ton lots), No. 1, 5.50c up.
Sulphite bonds, 6½c to 7½c.
Writings, 4½c up.
Grey Browns, $2.10 to $2.75.
Fibre, $3.00 to $3.75.
Book papers (ton lots), 4.25c to 5.75c.
Manila, No. 2, $2.75 to $3.50.
Heavy ledger stock, $1.60.
Book papers (carload), No. 3, 4.00c to 4.25c.
Ordinary ledger stock, $1.25.
Manila, B., $2.50 to $3.25.
Manila, No. 1, $3.25 to 3.75.
Unglazed Kraft, $3.50 to $4.50.
Glazed Kraft $4.25 to $5.50.

Pulp.

Ground wood pulp (at mill), $15 to $16.
Ground wood, $20 to $23, delivered.
Sulphite (unbleached), $38 to $42 del. in Canada.
Sulphite (unbleached), $38 to $44, delivered in U.S.
Sulphite (bleached), $54 to $59.

Paper Stock.

No. 1 hard shavings, $2.00.
No. 1 soft white shavings, $1.85.
No. 1 mixed shavings, 40c.
White blanks, $1.00.
No. 2 book stock, 50c.
No. 1 book stock, 80c.
No. 1 Manila envelope cuttings, $1.15.
No. 1 print Manilas, 70c.
Folded News, 32½c.
Over issues 45c.
No. 1 cleaned mixed paper, 22½c.
Old white cotton, $1.75.
No. 1 white shirt cuttings, $4.75.
Black overall cuttings, $1.37½.
Thirds, blues, $1.20.
Black linings, $1.25.
New light flannelettes, $3.75.
Ordinary satinets, 80c.
Flock, 90c.
Tailor rags, 65c.
Blue overall cuttings, 3.37½.
Manila rope, 2½.
No. 1 burlap bagging, $1.00.

Quotations f.o.b. Montreal are:—

Book—News—Writing and Posters.

Roll News, $40 to $43 per ton for large orders; $45, to $50 per ton for small orders.
Ream News, $45 to $47 per ton for large orders; $50 to $60 per ton for small orders.
No. 1 Book, 5¼c to 5¾c per lb.
No. 2 Book, S.C., $4.50 to $4.75 in large quantities; $4.75 to $5.50 in small quantities.
No. 3 Book, M.F., $4.00 to $4.25 in large quantities; $4.40 to $4.50 in small quantities.

Writings, 5c to 7½c.
Sulphite Bond, 6½c to 8½c.
Writing Manila, 5c.
Colored Posters, 4½c to 5¼c per lb.

Wrappings.

Grey Brown, per 100 lbs., car lots, $2.25 net; 5 tons $2.45; 2 tons, $2.55; 1 ton, $2.65; less, $2.75.
Red Brown, car lots, $2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, $3.15; less $3.25.
B. Manila, car lots, 2.85; 5 tons, $2.95; 2 tons, $3.05; 1 ton, $3.15; less, $3.25.
No. 2 Manila, car lots, $3.10; 5 tons, $3.20; 2 tons, $3.30; 1 ton, $3.40; less, $3.50.
No. 1 Manila, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton, $3.65; less $3.75.
Kraft, $3.75 to $5.00.
Fibre, car lots, $3.25; 5 tons, $3.45; 2 tons, $3.55; 1 ton, $3.65; less, $3.75.
Fibre, $2.75 to $3.50.
Manila, B., $2.50 to $3.25.

On large orders to the jobbing trade some manufacturers are quoting 10 per cent off the above prices on wrapping.

Pulp.

Sulphite easy bleaching, $43 to $45 per ton.
News quality, $41 to $42 per ton.
Bleached sulphite, $54 to $59 per ton.
Kraft pulp, $3.60 to $4.00.
Ground wood, $20 to $23, delivered in United States. States.

NEW YORK MARKETS.

(Special to Pulp & Paper Magazine.)

New York, June 12, 1915.

Buying in ground wood is practically at a standstill at present. Copious rains in and around the manufacturing centres during the interval, has enabled manufacturers to grind all the pulp they require. This naturally is very good for the consuming manufacturer, but the grinders who manufacture pulp for sale only are being hard hit. As a matter of fact, accumulations are increasing daily, and supplies on hand at the consuming points are said to be fairly heavy. Just what the outcome will be cannot be determined for another month, but it is the common belief that the seller will soon have his day, and that when the time comes he will not only have a very good quantity on hand, but will be in a position to command very good prices. Movement at present is confined almost entirely to contract withdrawals. Though sellers are asking $16.50 for the No. 1 grade and $14.50 for the No. 2 grade, at the mill, no sales of importance have been reported in any quarter during the past ten days. Several dealers in their attempt to move stocks are reported to have greatly shaded prices, but no authentic information can be had along this line.

The undertone of the chemical pulp market is gradually growing stronger. The suspension of traffic between certain points in Scandinavia and England is having its direct bearing upon the market, both here and in Europe. Consumers in this country are very much interested in how the market will turn, and are watching it carefully. The fact that local importers reported during the past week as having received more inquiries than any corresponding period since the first of the year, leads one to believe that they are feeling out the market very carefully. As far as actual sales are concerned, however, business has been very poor. Importers are still holding up their prices, but the American consumer seems to be of the belief that now that England is cut off from receiving Scandinavian pulp, there will be heavy supplies on hand, with practically no outlet except the United States. This being the case, the supply will be greater than the demand, and consumers by continually holding off will be in a position to force prices down. Though the foregoing applies chiefly to Unbleached Sulphite, the situation is equally as true with the Bleached grades. Sulphate and Kraft pulps are inclined to be weak and unattractive as far as movement is concerned. Prices are too high to interest the consumers, who in most cases, say they have ample stocks on hand to tide them over for a number of months to come.

Waste paper stocks are probably the most uninteresting in the line of paper makers' materials. Old waste papers are decidedly quiet and inactive. As a matter of fact local dealers have such heavy supplies on hand at present that they virtually have to force them on to the consumer, and at prices that are far below the current market price. It is the common belief that most packers are losing money—in any event, very few are making any. It is impossible to estimate just how long the present conditions will last, but no one sees any clearing until the fall. Rag stocks, both foreign and domestic, are little better off. Mills seem to have a pretty good supply on hand at present, and when they do buy supplies it is only for their immediate needs. Domestic stocks are very weak in price, and many sales are being made at ridiculously low prices. Gunny bagging is holding up remarkably well, considering the situation in the other supplies. As a matter of fact, prices are not only being maintained, but in some cases are being substantially advanced. This is due chiefly to the scarcity now prevailing.

There has been practically no change in the local paper market during the past fortnight. As reported in the last issue of the Pulp and Paper Magazine, the situation is very poor indeed, and prices in almost every line are subject to drastic cutting at times when competition is most keen. Paper manufacturers visiting the local trade during the past week stated, in an interview with your representative, that though their mills were being kept in operation, they were running on a very unsatisfactory, and in many cases, unprofitable basis. This condition is being greatly emphasised by the fact that local jobbers, who have always been the optimistic light in the trade, have been complaining of the poor business and the great depression. A careful survey of the position of the various grades of paper to-day, reveals the fact that newsprint is the only grade that has shown any improvement during the past fortnight. This is due to the fact that several of the larger mills in this country have followed in the footsteps of those in Canada and withdrawn their prices. The market has consequently shown some signs of strengthening. Competiton is less keen and manufacturers now believe that they will sooner or later be in a position to maintain a much higher standard of price. Tissues still are pretty good in demand values are being upheld. The keen competition in tissues noted two weeks ago still prevails. All grades are selling greatly below the cost of production, and every indication points to the belief that the situation will remain unchanged throughout the summer months. It is talked of in the trade that several of the larger mills are considering the advisability of closing down completely. This would naturally take a large tonnage off the market, and if the remainder of the manufacturers would "get together" and agree to sell only at a profit, the market would shortly rebound to its former firm position. The Fibre and Manila market is little different than the Tissue market. Prices in both grades continue to be shaded and slashed whenever there is any business in sight. Though Kraft papers are moving in a small way only, the manufacturers are in a much better position than those making other grades of paper. Book papers are feeling the effect of the present depression, and buying is very light. Values, nevertheless are being well maintained, and the situation shows more prospects for fall improvement than it did a month ago. Box boards of every description are also quiet and inactive, but there has been no change noted in the prevailing price schedule. Market quotations in all lines are more or less nominal. The subjoined figures represent the average prices, but must not be taken as a criterion.

Pulps.

Ground Wood, No. 1, $16 to $17, delivered.
Ground Wood, No. 2, $14.50 to $15.50, delivered.
Unbleached Sulphite, dom., 2.20c to 2.75c, delivered.
Unbleached Sulphite, impt., 1.75c to 1.95c, delivered.
Bleached Sulphite, domestic, 3c to 3.40c, delivered.
Bleached Sulphite, impt., 2.60 to 2.90, ex dock, N.Y.
Easy Bleaching, impt., 2.15c to 2.20c, ex dock, N.Y.
Unbleached sulphate, impt. 1.80c to 2c, ex dock, N.Y.
Bleached sulphate, impt., 2.75c to 2.85c, ex dock, N.Y.
Kraft Pulp, 1.85c to 1.95c, ex dock, New York.

Paper.

News, Rolls, transient business, $2.10 to $2.15, f.o.b.
News, Rolls, contract renewals, $2.00 to $2.10, f.o.b.
News, side runs, $2.00 to $2.05, f.o.b.
News, Sheets, $2.20 to $2.35, f.o.b.
Book papers, car lots, S. & S.C., $44.00 to $44.50, f.o.b.
Writing paper, extra superfine, 13½c to 17c, del. east of Miss. River.
Writing paper, superfine, 11c to 13c, del. east Miss R.
Writing paper, No. 1, fine, 9c, del east Miss. River.
Writing paper, No. 2, fine, 8c del. east Miss River.
Writing paper, engine sized, 5c to 8c, east Miss. R.
Bond paper, 5c to 24c, delivered east of Miss. R.
Ledger paper,5c to 25c, delivered east of Miss. R.
Linen paper, 8c to 18c, delivered east of Miss. River.
Manila jute, 4¾c to 5c, delivered.
Manila, wood, 2.30 to 3c, delivered.
Kraft, No. 1, (dom.) $3.60 to $3.75, f.o.b. New York.
Kraft, No. 2, (dom.) $3.35 to $3.50, f.o.b. New York.
Kraft, imported, 3.95c to 4c, ex dock, New York.
Boxboards, news, $23 to $26 per ton, delivered.
Wood pulp board, $40 to $42.50 per ton, delivered.
Boxboards, straw, $21 to $24 per ton, delivered.
Boxboards, chip, $22 to $25 per ton, delivered.
Tissue, fourdrinier, 50c f.o.b. New York.
Tissue, white, cylinder, 40c to 42½c, f.o.b. New York.

The decision has been reached by thoughtful men, after giving careful study and thought to the matter, that the only way to effectively handle the State-owned lands in the Adirondacks and Catskills is to place them under a Constitutional Conservation Commission. This large area would not only secure large returns to the State from the forest product, but would provide tremendous water reservoir, and recreation ground for the people of the State.

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